ELECTRICAL REVIEW

FOUNDED 1872

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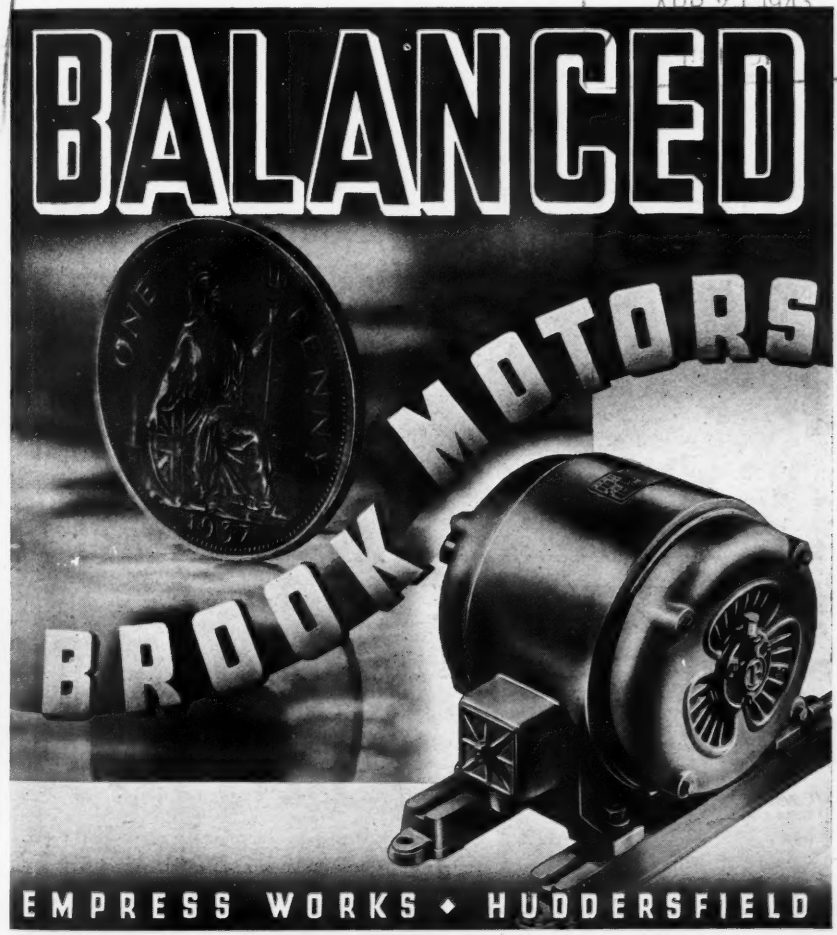

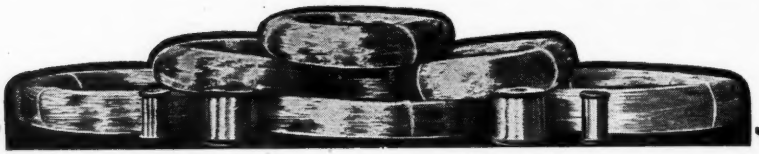

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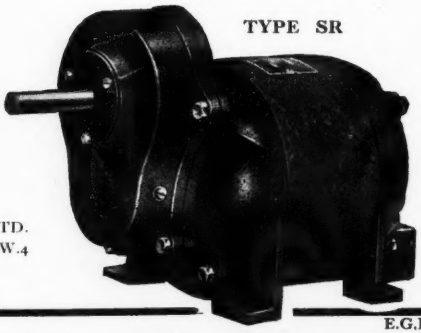

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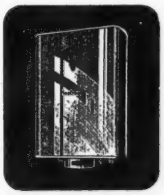

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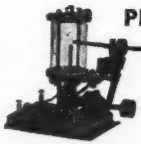

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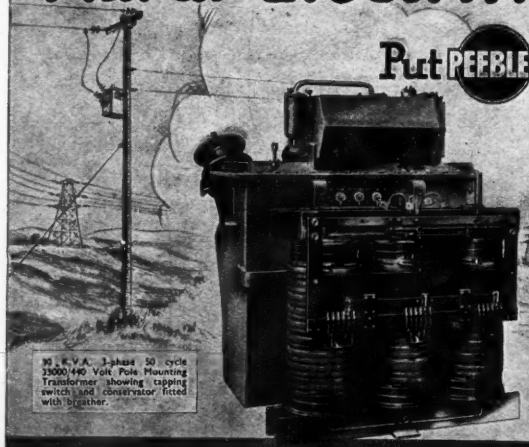

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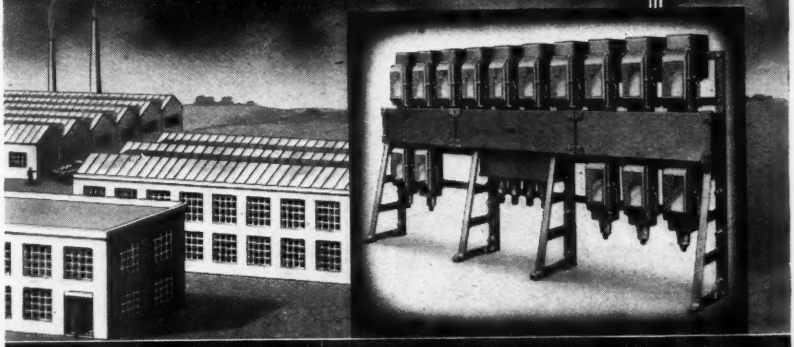

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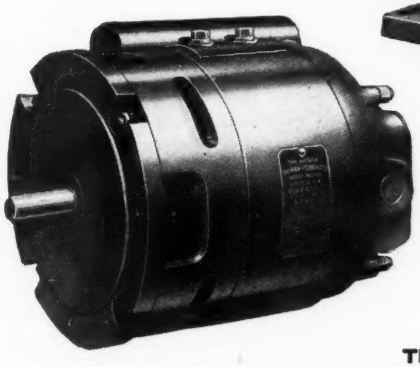

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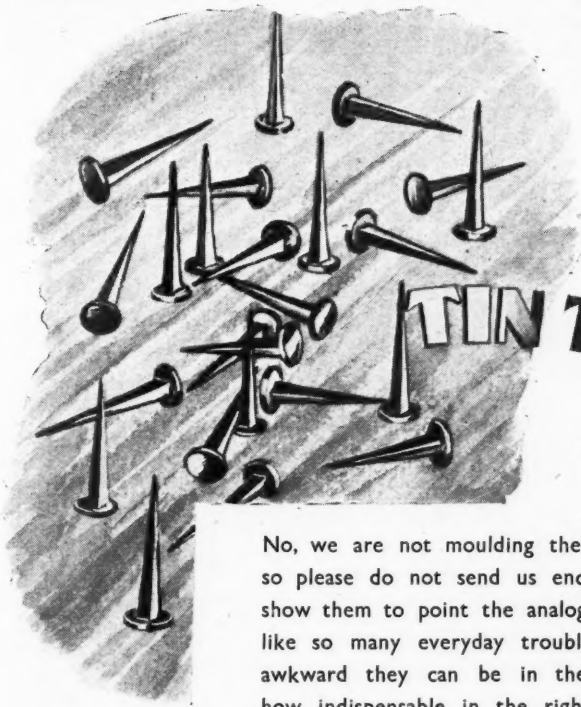

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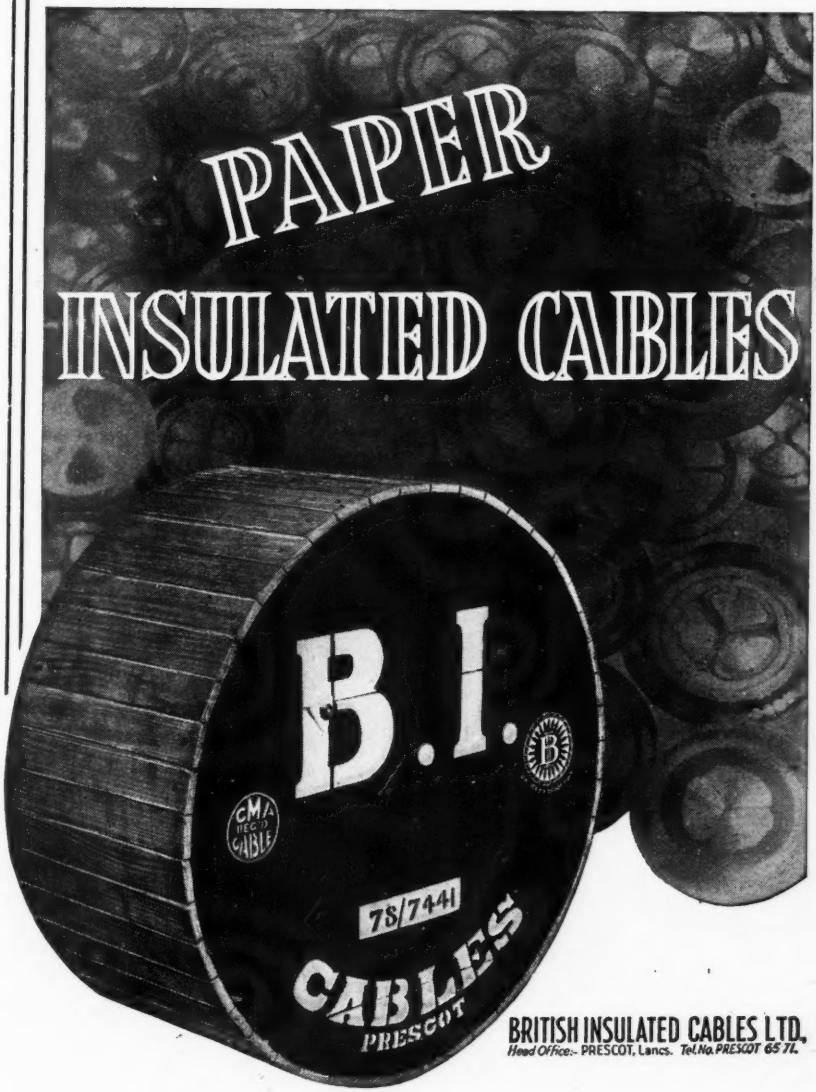
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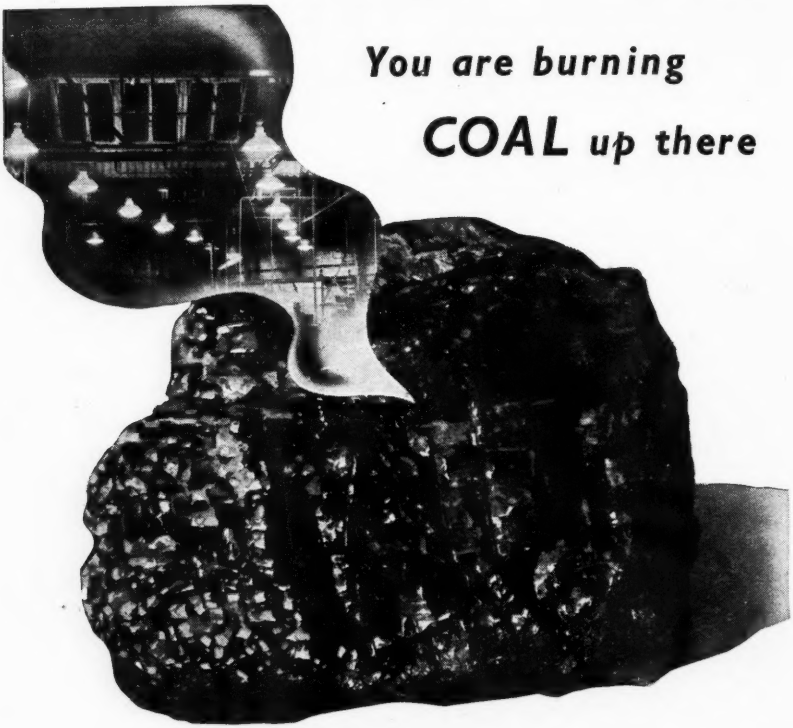

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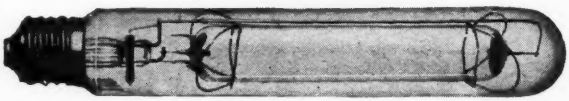
Crompton Discharge Lamps give a quality of light highly efficient for most purposes, and by lasting longer they effect a saving of labour on maintenance. By installing Crompton Discharge Lamps you will be helping the nation as well as yourself



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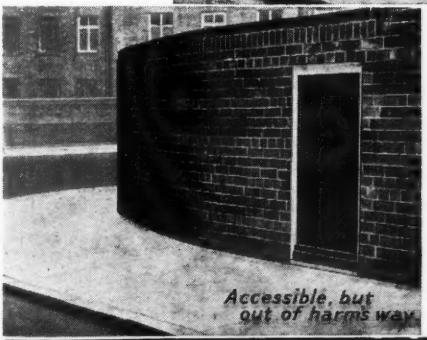

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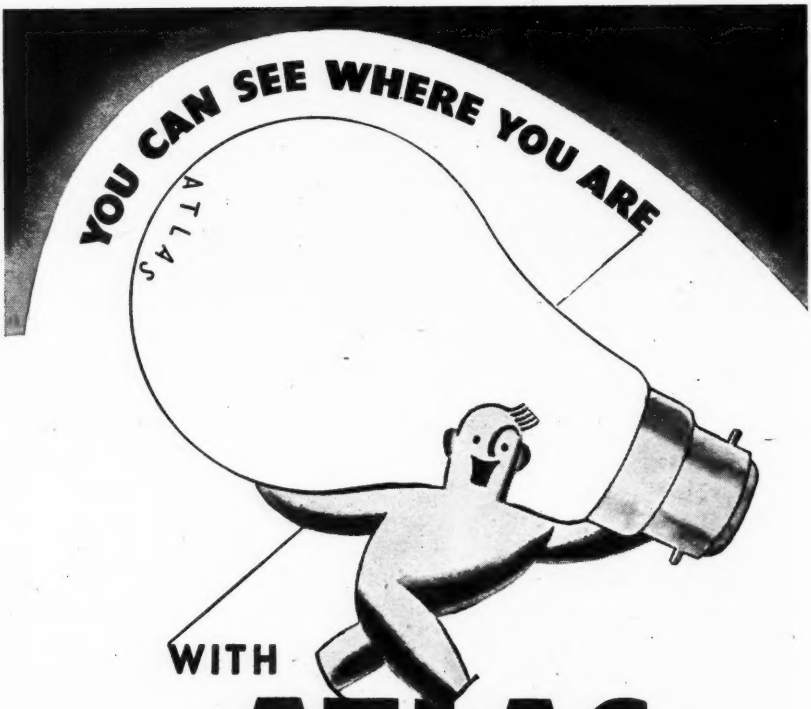

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You don't have to take chances because every Atlas Lamp goes through such rigid tests at the factory, just as exacting now as in peace time, that you can sell them with confidence. Very large users — who can and do keep accurate tests of lamp performance — buy more Atlas Lamps than any other single make. You make more profit by selling Atlas. Ask for our current terms.

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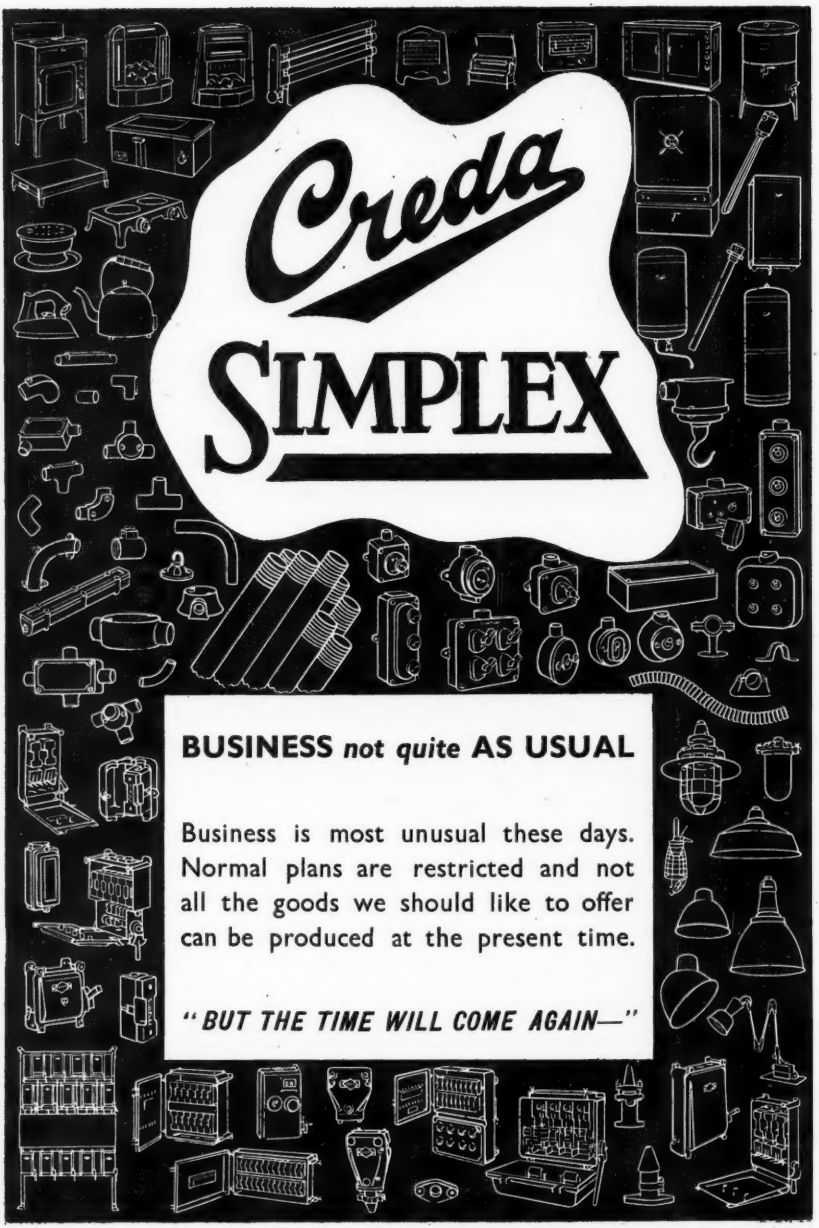
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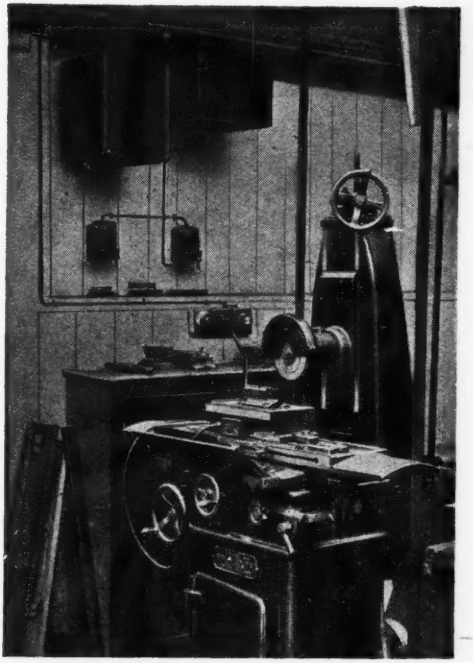
BUSINESS not quite AS USUAL
Business is most unusual these days. Normal plans are restricted and not all the goods we should like to offer can be produced at the present time.
"BUT THE TIME WILL COME AGAIN—"

Reliability proved by long service



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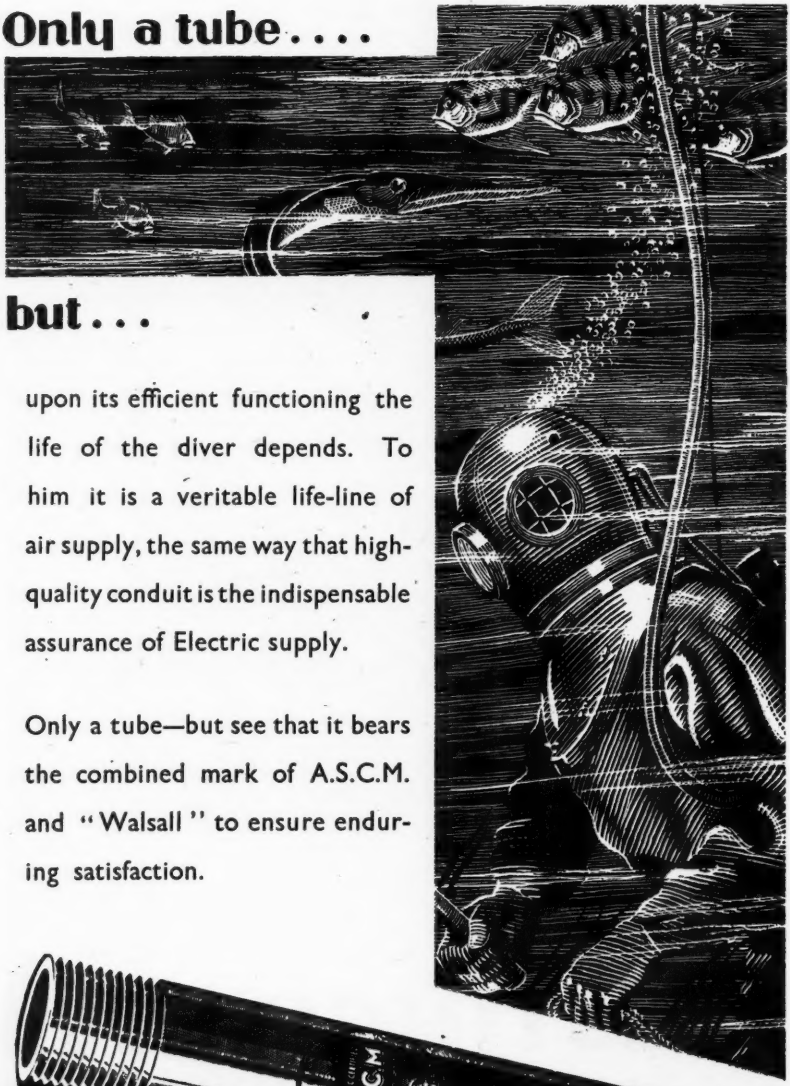

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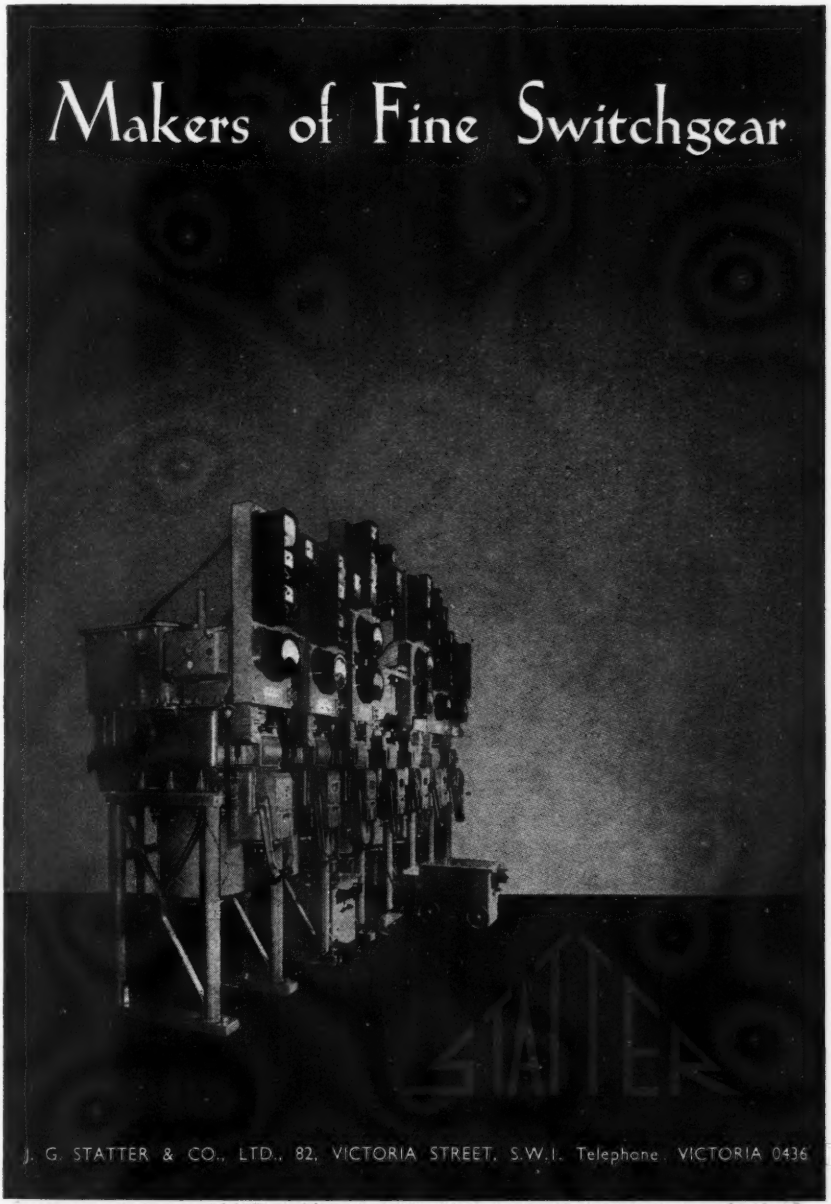

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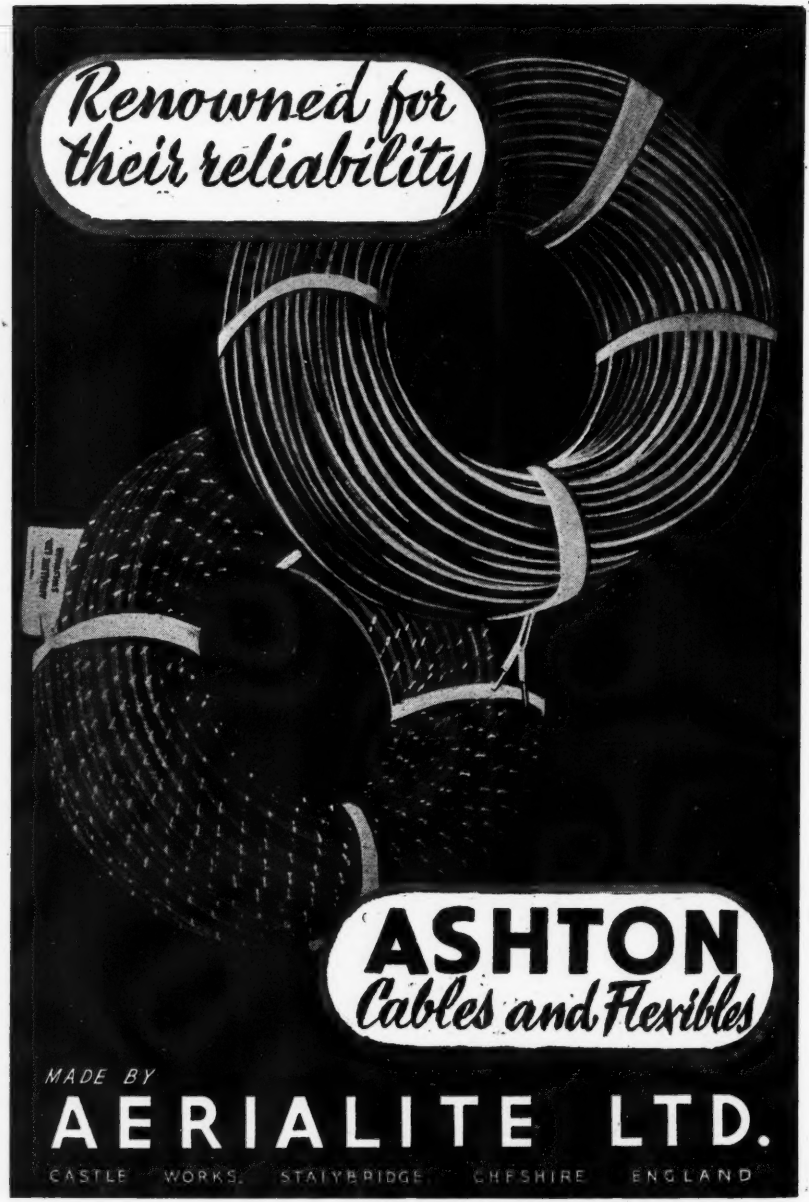
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Cables and Flexibles
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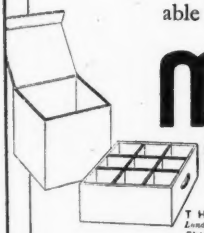
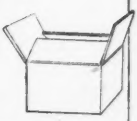
Morning Glory

Some day a day will dawn when thoughts will turn to peace and to making again the things we have had to do without. In the meantime, each day brings us its problems and its opportunities, problems as to how best we may supply the packaging needs of our customers and opportunities to give that standard of service on which we are able to pride ourselves even in these times of war.



MEDWAY

CORRUGATED CASES



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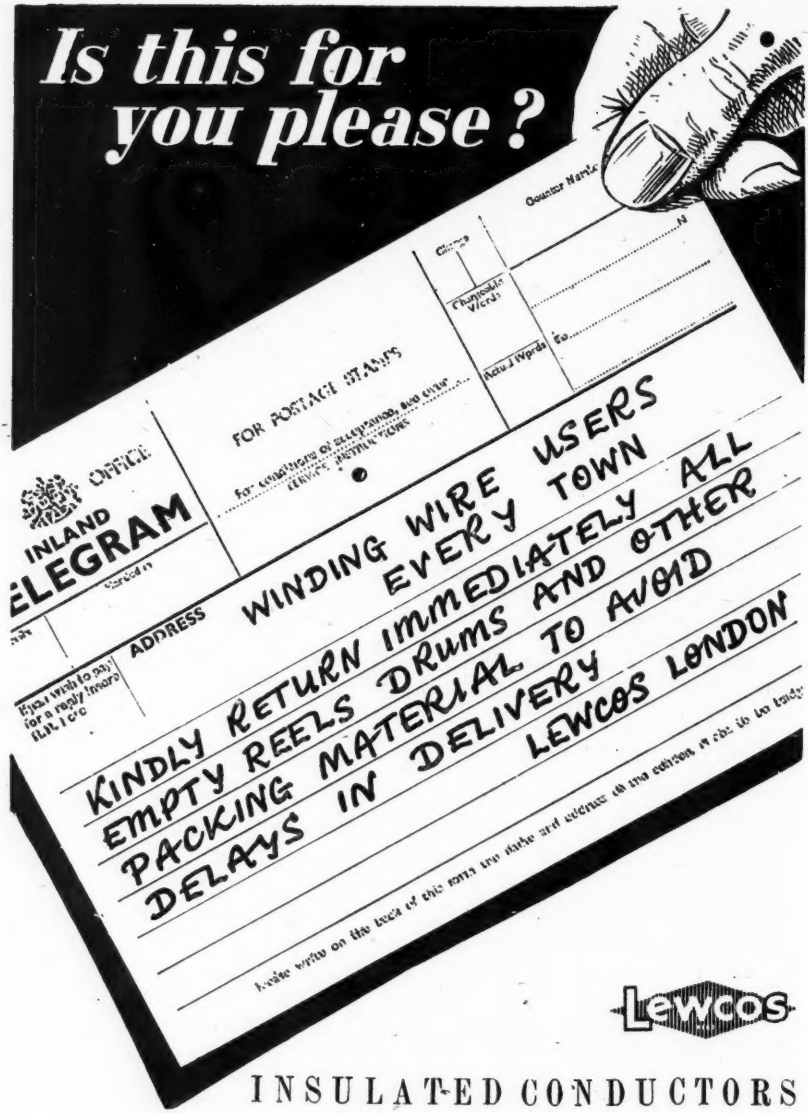

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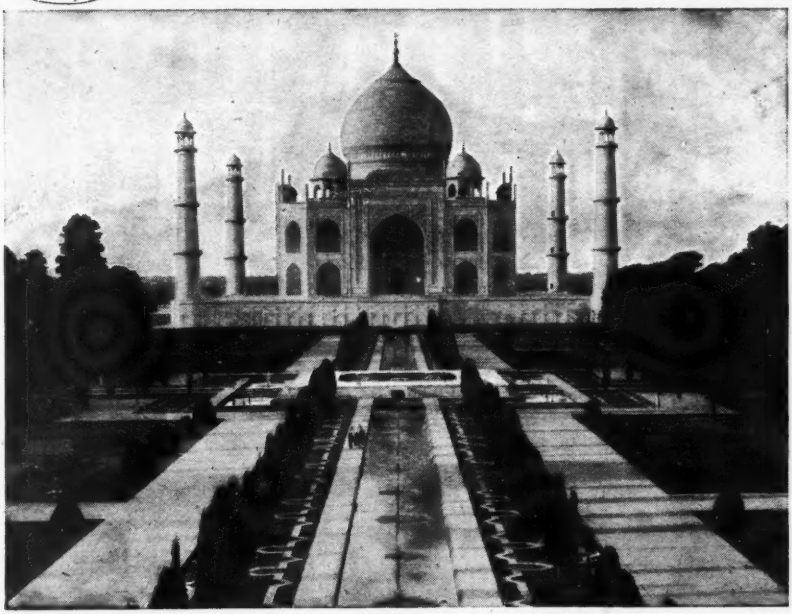

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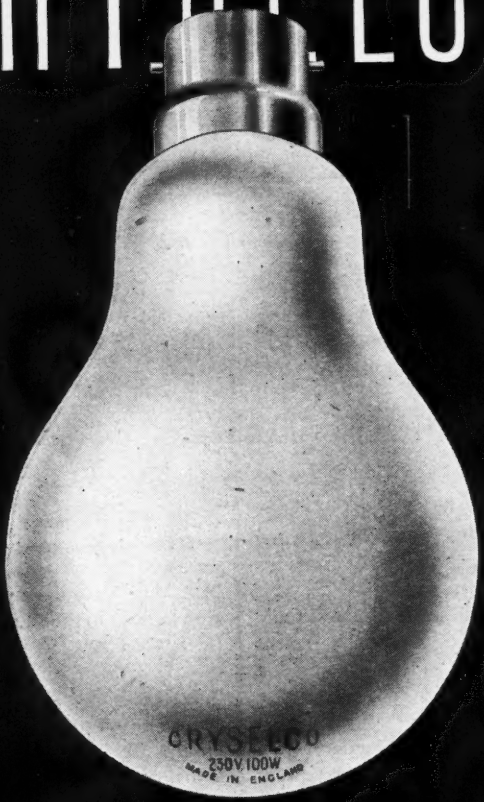

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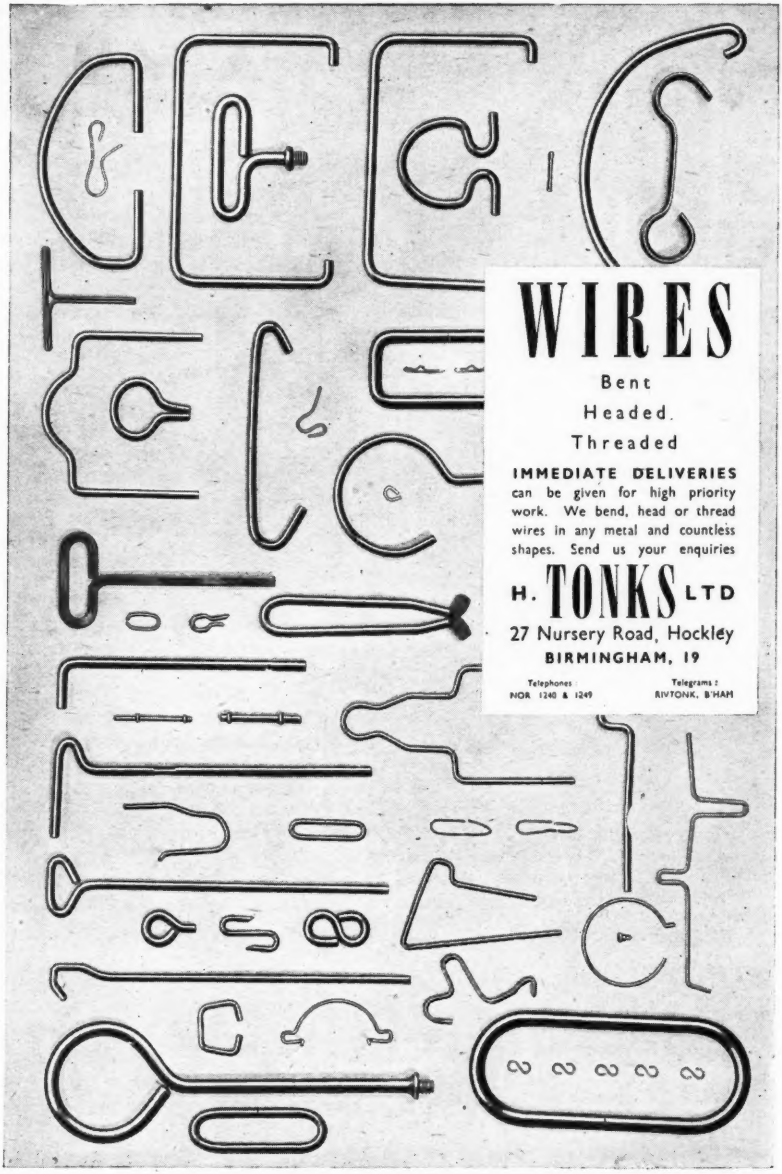
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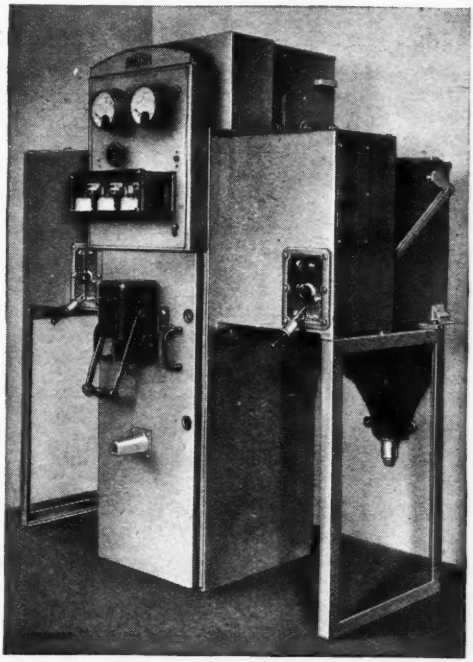

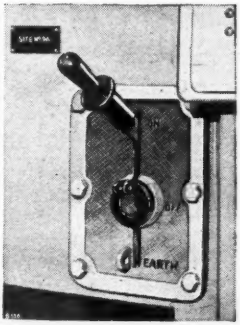

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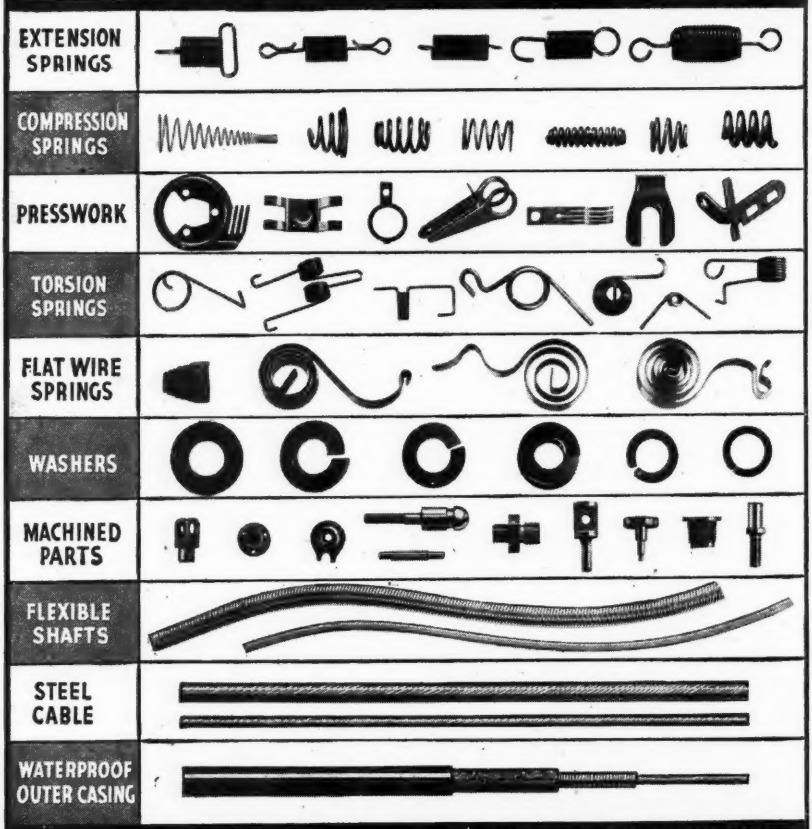

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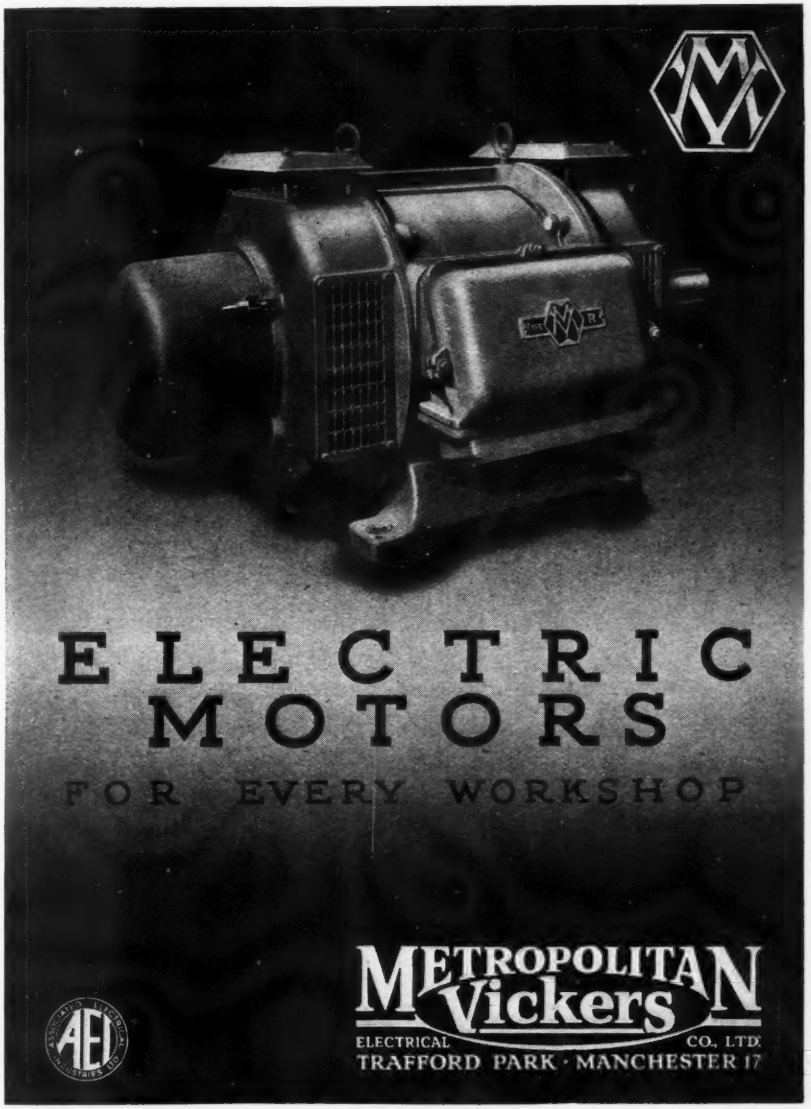

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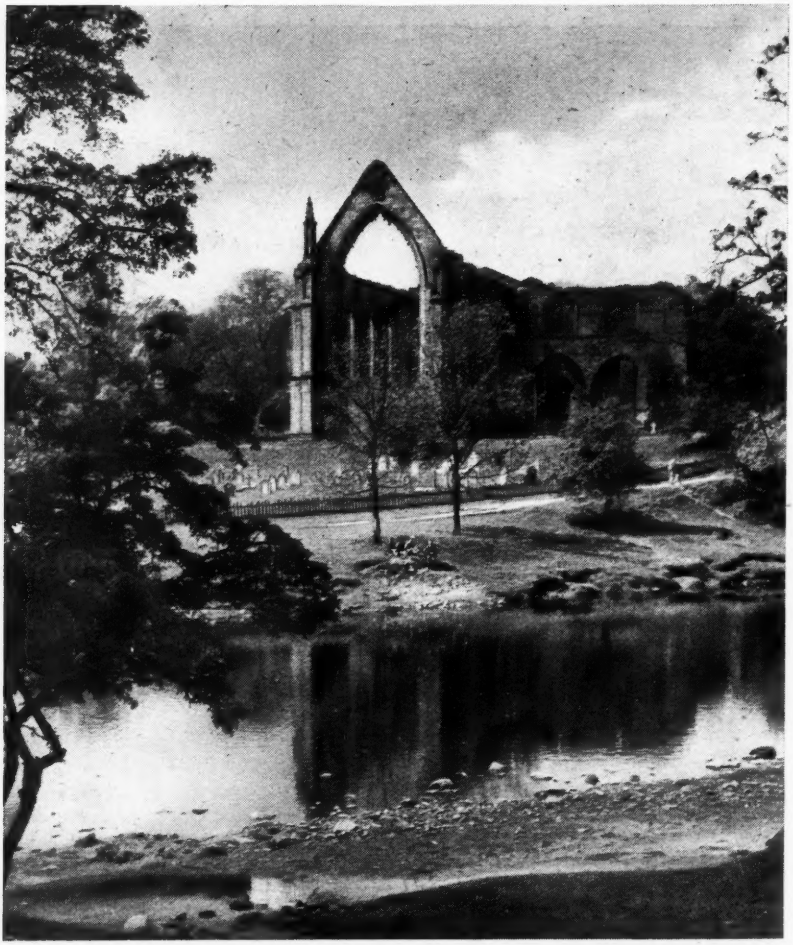

NOTABLE among the abbey ruins which enrich our country, Bolton Abbey is situated in a highly picturesque district on the River Wharfe in Yorkshire. Founded about A.D. 1150 by Augustine canons, the Abbey was developed from time to time, and the architecture ranges from Early English to Perpendicular. The nave has been restored, and the old barn is still in use. Bolton Abbey became widely known through the works of Wordsworth and Landseer.

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ELECTRICAL REVIEW

Volume CXXXI **No. 3382**

Friday, September 18, 1942

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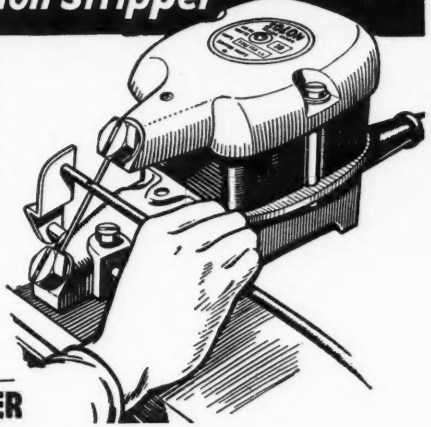

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXI. No. 3882. SEPTEMBER 18, 1942 6d. WEEKLY

Power Station Sites

Factors Governing or Limiting Choice

FUNDAMENTAL to the efficient supply of electricity is the suitability of the site for the generating plant. This is, indeed, of greater moment than the quality of the plant installed on it, since machinery can be replaced when it becomes inadequate or obsolete, whereas the main features of the site, whether aiding or handicapping attempts to achieve the best results, are permanent.

On account of the primary requirements of great quantities of cold water for condensing the steam exhausted by the turbines (in weight about 600 times that of the coal consumed), space to store about three months' stock of coal, facilities for disposing of ashes (perhaps, one-eighth of the weight of coal burned), convenience of connection to the grid and many other hardly less important considerations, good sites are uncommon, and—owing to the growth of station capacities—they are becoming increasingly so.

Cooling Tower Advantages

An important alleviation of the difficulties due to lack of water in the quantities necessary has been found in the employment of concrete hyperbolic cooling towers, in conjunction with which the use of sewage effluent seems likely to be extended in the future. The advantages of the flexibility thus given to the choice of site may more than offset the sacrifice of thermal efficiency that results from dependence on cooling towers. Price of land, too, should be appreciably less than where water is abundant, since at such places the claims of industrial works for sites are likely to be in competition with those of electricity supply authorities.

Selection of a site with technically desirable characteristics does not, however, end the quest. There are still a number of legislative obstacles (many of them introduced within recent years) that must be disposed of before the power station can be constructed. The position in this regard is a good deal more complicated than the engineering aspect.

Coal Prices and Quality

Helpful guidance through the labyrinth is given by Mr. F. Favell in a contribution to the *I.E.E. Journal*. First of all there are zoning and other provisions relevant to the subject under the Town and Country Planning Act, 1932. These ought not to give much trouble in most cases if the right steps can be taken initially. More troublesome, often, will be the Coal Act of 1938, which makes it impermissible to erect a power station where to do so would prevent the winning of coal under the soil.

Another reason, an artificial one, for constructing a station on one site rather than another may be that, under the Coal Mines Act of 1930, coal has to be purchased in the area in which it is consumed, even though it may be cheaper or of better quality in an adjoining one. Now, the average pit-head price in a particular district, as Mr. Favell points out, depends upon the capital, operating and administrative costs of the coal organisations and

bears no relation to the quality of fuel, so that the undertaking is at a distinct disadvantage if it generates in areas where these costs are high.

The inequity of this arrangement is that it creates an undesirably adventitious value for some sites, and depreciates the value of others that may be equally good. Engineers have urged that coal should be purchased on the basis of B.Th.U. per lb. The figures are now available. The principle of relating calorific value to price has always been sound; present conditions make it almost necessary as well.

Contract Prices

BUSINESS is normally based on stable prices. In a period like the present, with values changing almost daily, it becomes very difficult to arrange a price fair to both contractor and customer. The latest attempt to ensure this in the electrical industry is dealt with on another page where clauses and formulæ evolved between the B.E.A.M.A. and the I.M.E.A. are set out. The necessity for such formulæ is made more apparent by the decision of the engineering and shipbuilding unions last week to press for another all-round increase of wages.

Flexible Cables

THE official report on the explosions at Barnsley Main Colliery last February contains a pertinent criticism of Regulation 131 (i). This regulation, while requiring that flexible cables shall be examined at least once a shift, does not prescribe that this examination shall be made at the beginning of the shift before the cable is put into use. This deficiency is made good in Regulation 25 of the revised code, published in 1940, which, however, has not yet been given statutory force. The present occasion reinforces the plea we made at that time that all concerned should work to the new code, even before it becomes obligatory.

Coal and Competition

WHILE electricity supply engineers are inclined to view with alarm increases in the price of coal they are not so badly affected as their gas undertaking rivals if a writer in the *Gas Times* is to be believed. He says that "a general increase in the price level of coal would certainly increase the relative strength of electrical competition, particularly in the domestic sphere." An increase of 10s. a ton on coal, if no additional return from coke is allowed for, represents an increase of 1½d. per therm in the price of gas, *i.e.*, taking the average price, from 9d. to 10½d. a therm or 20 per cent. The same increase in coal costs, with a generation efficiency of 22 per cent., would raise the cost of electricity by 0.062d. per kWh. The average price received per kWh for domestic purposes before the war was 1.7d.; therefore the increase would be only 3.7 per cent.

Compliment to E.P.E.A.

"JANUS" of the *Gas Times* often says hard things about the electrical industry but he is sometimes appreciative. For instance, he recently suggested that the gas industry needed a body similar to the Electrical Power Engineers' Association to settle and regulate gas engineers' conditions and salaries. As a measure of the success of the E.P.E.A. he says: "There are no strikes or lock-outs or nonsense of that sort—it is simply a matter of negotiation."

Canadian Power Position

ACCORDING to Mr. McNeely DuBose, retiring president of the Canadian Electrical Association, Canada started the war with 7,600,000 HP of generating capacity and a load factor of 57 per cent. At the end of March last 700,000 HP had been added and the load factor had risen to 70 per cent. Although the manufacturers of power plant would eventually catch up with the rapidly-expanding demand for electricity there would be an interim period during which something would have to be done to preserve a safe margin, and Mr. DuBose hinted that this would take the form of peak load control and the curtailment of supplies for non-essential uses.

Mechanical Gearing

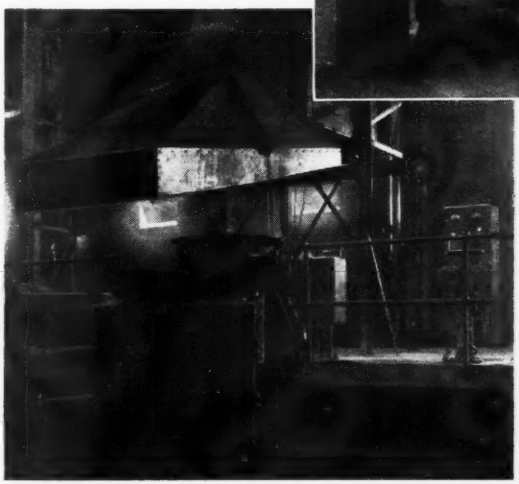
AN outstanding characteristic of Sir Charles Parsons, one which made his work so effective, was his ability to realise the implications of his inventions and to carry them through to their practical end. One example of this formed the subject of this year's Parsons Memorial Lecture, which was delivered by Dr. S. F. Dorey on Wednesday. This related to his pioneer and later achievements in the development of mechanical gearing, which enabled the marine steam turbine to alter the whole aspect of high-speed ship-propulsion.

Brass Making

Extensive Use of Induction Melting Furnaces

THE induction furnace installation at a large brass-producing factory which we recently visited was particularly interesting because in peacetime we had not had the opportunity of seeing induction-furnace brass production on a large scale owing to the smaller demand for the metal. The furnace output in this respect is particularly significant because, as electrical melting can only start with molten metal in the furnace channel, working 24 hours a day is essential. The processes embraced by the installation in question relate particularly to the production and preparation of the metal for the subsequent drawing operations for the production of cartridges.

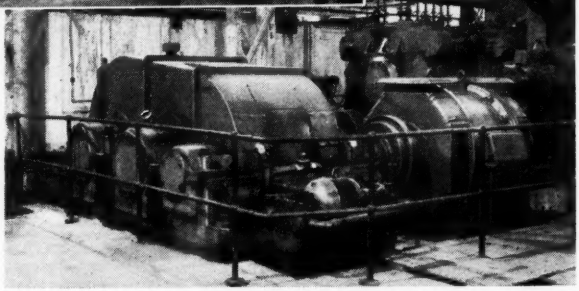
Virgin-metal copper and zinc billets are first dealt with by shears on which the metal is cut to sizes convenient for weighing up the desired furnace charges. The shears are driven by a 30-HP enclosed ventilated squirrel-cage motor from which there is simple transmission through reduction gear to the machine shaft. A push-button control unit on the machine operates a star-delta starter. The weighed-up charges of virgin metal and scrap are transported by crane to and deposited on the operating platforms near the respective furnaces. An overall charge for one furnace is about 900 lb., but to permit continuous working about 300 lb. of molten metal must remain continuously in the furnace. The operating cycle for the 900 lb. working charge requires about 70 minutes from pouring to pouring.



Left : The correct tappings for each induction furnace are selected by tapping links on the control board seen in the background ; note open moulds at front of furnace
Above : The tilted furnace pours simultaneously into two water-cooled moulds

Each melting furnace is fed independently at 400 V, single-phase (phase to phase) by a separate feeder direct from a convenient substation. The furnace coil is supplied from the tapped secondary winding of a 115-kVA, 400-V, single-phase 50-cycle transformer from which there are generally full-load and standby voltage ranges of 360 to 440 and 128 to 180, respectively, both in 20-V steps. The correct tappings for the desired voltages are selected by tapping links on the control board and the changes to and from the melting and standby positions

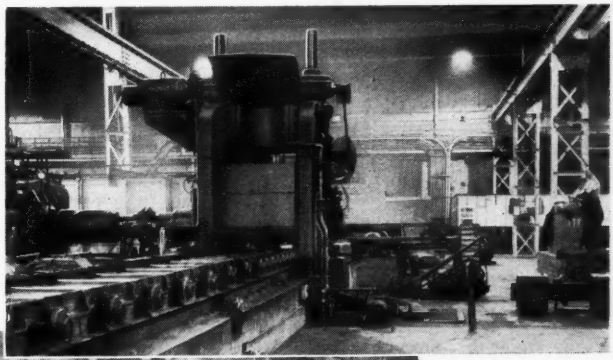
on the transformer are effected by a 300/143-A two-way and off Ellison main operating oil switch. The whole of the normal heating operations are effected by this change-over switch without thermostatic or automatic control. There are, however, alarm circuits brought out to the control board and operated from current coils and relays which indicate metal circuit breakages (too much molten metal poured out) and failures of the cooling system and power supply. In addition to the usual measuring instruments the control panel is equipped with melting, standby, and off, pilot lamps.

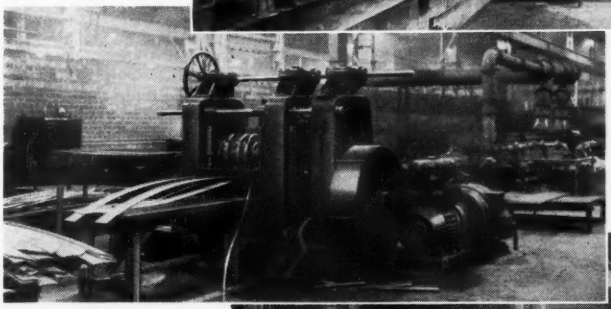


Top : The 12-ft. traversable table milling machine has a table speed of 1 ft. per sec. Left : The first billet is lifted off its shoes, withdrawn from the preheating furnace chamber and deposited on the roller feeding table of the hot rolling mills in the left-hand part of the picture; table motor, right Below : The hot rolling mill is driven by a 400-HP, slip-ring reversing motor through heavy reducing and positive drive gears

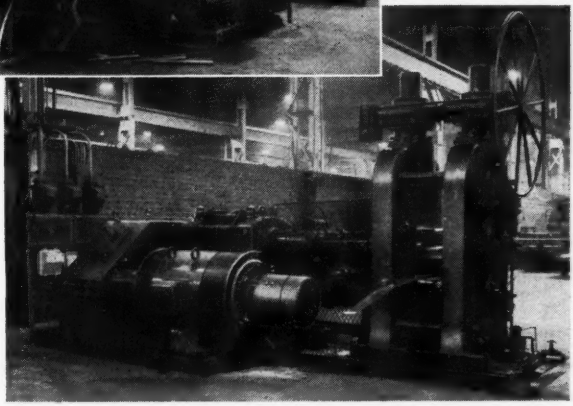
The furnace is tilted by a 3-HP wound-rotor totally enclosed motor, the speed of which is varied by a drum controller immediately near the furnace. The motor is housed in an overhead structure above the furnace with the tilting winch which it drives, and there are limit switches to prevent over-tilting. The tilted furnace pours simultaneously into two water-cooled moulds which stand permanently in the pouring position and have hinged doors or half sections which permit the easy removal of the castings and predressing the copper linings of the moulds

with plumbago and oils before the pouring. Each furnace is rated at 115 kVA and the full-load and standby currents are 285 A (400 V) and 90 A (130 V). The consumptions for a melt and a complete cycle are 88 kWh and 92 kWh, respectively, the melting and complete cycle times being 60 and 70 minutes, respectively. The overall and furnace coil power factors are 0·9 and 0·75, respectively. The molten metal temperature is 1,100 deg. C. Each furnace is of the Ajax-Wyatt type which depends for its operation on the maintenance of the secondary channel of molten metal about the furnace coil. If this channel is allowed to solidify, reconstruction of the furnace is necessary. The assembly is a lengthy operation which requires up to, say, 18 hours ramming of the refractory around the wooden former which is later burnt out to form the channel. It will be appreciated, then, that the life of the furnace varies very much indeed, depending on the experience and skill of both the constructor and the operator.





Above: The preheating furnace mechanical operations and the rolling mill drives are controlled from the central station on the right Left : A gang cutter splitting machine cuts the sheet into three strips and removes the edges with roller knives

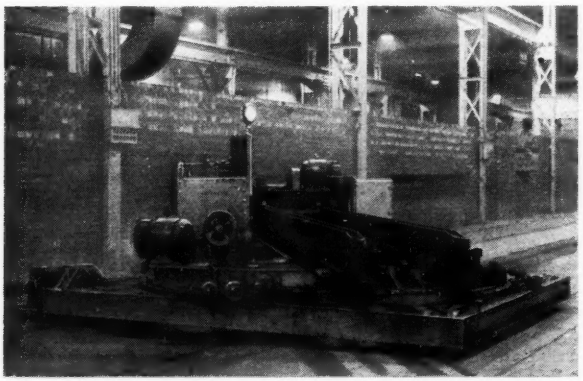


One cold rolling mill is driven by a 150-HP, synchronous induction motor

The billets from the induction furnace moulds, measuring 36 in. by 14½ in. by 2¾ in., first have their rough ends removed by cropping shears. Here the 60-HP, 1,350-RPM slip-ring, screen-protected driving motor is mounted high up on the machine and has V-belt transmission with a three-to-one reduction ratio on to a gear layshaft from which the cropping rods operate. The rotor resistance starter is operated by contactors controlled by push-buttons on the machine. To ensure good surfaces the ingots are treated when necessary on a 12-ft. traversable table milling machine which has a table speed of 1 ft. per second. The table motor is a reversible 7½-HP, totally enclosed,

fan-cooled unit. The 25-HP, screen-protected cutter motor runs continuously in one rotary direction but cuts only on one table direction, the cutters being lifted off the work on the opposite run. It drives the cutter equipments through a main enclosed gearing with two right-angle transmissions. There are also on this machine a swarf extraction fan motor and a table feeding motor which drives " throw-over " arms for lifting rods, etc., on to the table.

In preparation for the first rolling processes the ingots are preheated to 850 deg. C. during a 90-minute soaking in a pusher-type furnace. This equipment has three heating zones—back, middle and front—which produce temperatures of 800, 840 and 850 deg., respectively, and have a total heating load of 320 kW. To eliminate oxidisation, controlled atmosphere is maintained in the heating chamber by means of a burnt-atmosphere plant which feeds to the centre of the furnace and out at both ends. Each zone is separately thermostatically controlled and has its own Cambridge potentiometer-type regulator by which the Brookhirst contactor gear governing the element banks is actuated.



On the turntable charger are some particularly interesting transmission schemes

This contactor gear, together with that for the mechanical operations on the furnaces, is housed in a glazed sheet-steel cubicle.

A 500-A Ellison oil switch governs the complete supply to the furnace. Normally there is overall time-switch control for the heating. The furnace mechanical cyclic operations are manually controlled from a central switching station and a new billet is pushed into the back of the furnace every six minutes. Motor-driven pusher gear is responsible for this operation and each time the " push " is transmitted right through the train of billets in the furnace, so that the front billet is pushed to its final position in readiness for removal. At this moment the extractor at the front of the furnace passes its lifting arms into the heating chamber and under the first (front) billet which is then lifted off its shoes, withdrawn from the heating chamber and deposited on the roller feeding table of the hot rolling mill immediately outside the front end of and normal to the furnace line.

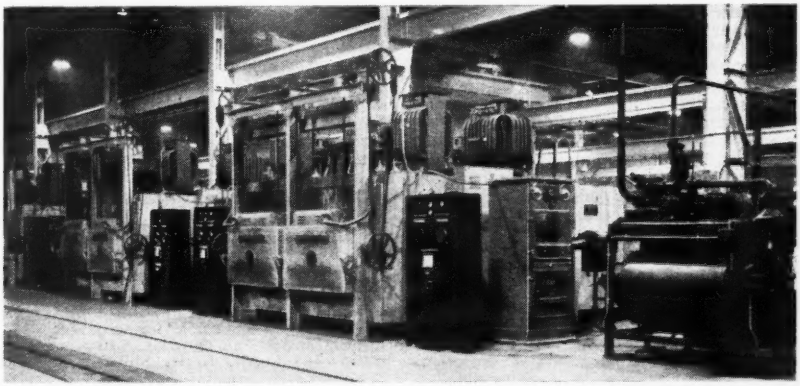
The billet is reduced to about $\frac{1}{4}$ in. thick in a number of passes, the reduction at each pass being decided by the amount of screw-down effected by one motor only surmounting the rolls frame and serving both screws. Normally, both screws are adjusted simultaneously, but by means of a solenoid-operated clutch between the screws either can be operated separately to tilt the rolls.

The hot-rolling mill is driven by a " Metrovick " 400-HP, 400-V screen-protected slip-ring reversing motor which transmits through a reduction gear embracing two right-angled transmissions to a one-to-one ratio " balancing " gear which imparts a positive drive to each roll. Lubricating-oil motor pumps serve both the reducing gear and positive drive units while there is a grease motor pump for the roll neck bearings. Two 10-HP, totally enclosed fan-cooled slip-ring motors serve the roller feeding table, each transmitting through a reduction gear to a line shaft from which each live roll is separately driven via its own gear unit.

All these AC mill drives are governed by DC-operated contactors, which are actuated direct from the central control station, except that the table motor reversals are sequence-control automatic operations consequent on the manually controlled reversals of the main motor. In addition to the two DC control switches for the main and screw down motor contactors, the mill man also has push-buttons for operating the furnace doors and pusher and extraction equipments. There is also a warning device which indicates failure of the oil supply to the gear boxes. If the mill is started without the oil pump motor on the gear box, the supply is automatically cut off after a predetermined time delay.

After its final hot rolling, the billet is converted into a strip about 24 ft. long which is next cut into a number of equal lengths by

shears arranged on an extension of the mill roller feeding table. The shears are driven by a 6-HP, 950-RPM drip-proof motor which transmits through two reduction gear trains to the eccentric shaft. The motor runs



The strip is treated in annealing furnaces in batches of about two tons

continuously under normal working conditions, but stored energy from a flywheel between the motor and the first reduction gear provides the necessary " punch " during the moment of cropping, the actual shears being operated by a clutch. A star-delta starter is served by push-button controls. A 10-HP motor for the shears roller table has similar transmission arrangements to those of the mill table motors.

In a pickling machine through which the shorter lengths of strip are passed on an endless conveyor, the strips are sprayed with an acid solution and then water, and emerge from the last spraying chamber. Variable speed is imparted mechanically to the conveyor by a P.I.V. gear transmission from a 1-HP constant-speed motor. The 15-HP acid and 2-HP water pump motors are directly coupled to the turbine pumps. These English Electric motors have direct-on-starting, except the acid pump motor, which has star-delta starting.

Strip Cutting

A gang cutter splitting machine, which next cuts the strips into three and removes the outside edges by means of roller knives, has a cutting speed of 60 ft. per minute imparted by a 40-HP, 960-RPM slip-ring Crompton Parkinson screen protected motor with transmission first through a Croft worm reduction unit and then through pinion gear. Push-buttons actuate the contactor gear for the rotor resistance. High-speed shears, which cut up the edge trimmings into short pieces suitable for feeding back to the melting furnaces as scrap, are driven by a 5-HP motor with simple V-belt transmission on to the heavy flywheel pulley on the eccentric shaft.

There are next a number of cold-rolling reductions which give the strip a final thickness. The cold-rolling mills are all similar and each is driven by a 150-HP, 1,000-RPM, screen - protected, synchronous induction, English Electric motor with transmission through a heavy reduction gear. The motor runs continuously, the mills being non-reversible and control is by Allen West contactor equipment.

Annealing Process

After having their ends cropped square in a shearing machine the strips are ready to be received by the furnace charger for delivery to annealing furnaces. On this turntable charger, which is supplied from an underground electrical distribution system, are some particularly interesting transmission schemes. The 3-HP, totally enclosed travelling motor transmits its power through a Moss gear on to the gear on the travelling wheel shaft.

The 3-HP, totally enclosed turntable motor transmits through a reduction gear on to a pulley over which travels a heavy link chain which is anchored to the bogie and circumscribes the turntable. Jockey pulleys afford the necessary guide to the chain over the driving pulley.

The charging arm motor, which is also a 3-HP, totally enclosed unit, is responsible for two operations—traverse for charging and withdrawing and lifting. The traverse is taken through a pinion gear to a sprocket wheel which engages a chain—anchored at both ends to the front of the arms carrier, the chain running the whole length of the

arms and round a pulley at the end. For the lifting operation the motor also drives a square shaft at the side of the frame along which a worm gear unit slides in such a manner that transmission from the shaft to the eccentric can be taken at any point along the shaft. The eccentric does not actually lift the arm but pulls a top member of the arm up ramps on the lower member which provide the lift.

All three motors on the charger are slip-ring units, the turning and travelling motors being both controlled by drum rotor resistance starters while the charging arm motor, which is a reversible unit, is automatically operated by means of contactors the actuation of which is initiated by push buttons.

The strip is treated in the annealing furnaces in batches of about two tons and brought up to about 600 deg. C., in, say, 2¾ hours. These furnaces are of the controlled atmosphere type and are served by burnt-atmosphere plant. Each furnace has two zones which are supplied and controlled separately, the loadings and supply voltages being 45 kW and 165 V and 90 kW and 330 V, respectively.

After withdrawal from the annealing furnaces the strip is quenched, treated in acid, washed and dried and finally flattened on a machine with gangs of rollers which remove the kinks put into the brass during annealing. After a final examination the material is ready for the drawing operations, with which we are not concerned in this article.

I.E.E. Programme

MEETINGS of the INSTITUTION OF ELECTRICAL ENGINEERS have been arranged for the forthcoming session as follows (in the event of cancellation of any meeting it is proposed to issue advance copies of the paper and members will be invited to submit written contributions for publication in the *Journal* as discussion on the paper, with the author's reply):

ORDINARY MEETINGS.—Thursdays, 5.30 p.m.

October 1*st*—Prof. C. L. Fortescue's inaugural address as President.

November 5*th*—"Coal for Steam Raising," by Mr. J. N. Waite. (Joint meeting with the Institution of Mechanical Engineers.).

December 3*rd*—"Standardisation as applied to Industrial Electrical Instruments," by Lieut.-Col. K. Edgcumbe.

February 4*th*—"General Factors Affecting the Uniformity of Tariffs," by Mr. C. T. Melling, and "Towards the 'Correct' Domestic Multi-part Tariff," by Mr. P. Schiller.

March 4*th*—Particulars to be announced later.

April 1*st*—Particulars to be announced later.

April 29*th*—The thirty-fourth Kelvin Lecture, by Prof. D. R. Hartree.

May 13*th*—Annual general meeting.

INFORMAL MEETINGS, Mondays, 5.30 p.m.

October 26*th*—Discussion on "Space and Domestic Hot Water Heating for Post-war Buildings," to be opened by the President.

November 23*rd*—Discussion on "The Electronic Control of Industrial and Power Plants," to be opened by Mr. S. G. King.

Dates for other informal meetings (subjects to be announced later) are January 25th, February 22nd, March 22nd and April 19th.

INSTALLATIONS SECTION.—Thursdays, 5.30 p.m.

October 15*th*—Mr. R. Grierson's inaugural address as Chairman.

November 12*th*—"Voltage Surges Caused by Contactor Coils," by Messrs. J. R. Taylor and C. E. Randall.

December 10*th*—"The Application of Electricity to Mine Pumping," by Messrs. G. B. Alvey and N. Tetlow.

Dates of other meetings are February 11th, March 11th, April 8th and May 6th.

MEASUREMENTS SECTION (formerly Meter and Instrument Section). Fridays, 5.30 p.m.

October 23*rd*—Mr. E. H. Miller's inaugural address as Chairman.

November 20*th*—"A Differential Electronic Stabiliser for Alternating Voltages and some Applications," by Mr. A. Glynne.

January 22*nd*—"Boiler House Measurements and Control for Efficient Fuel Utilisation," by Messrs. G. H. Barker and A. L. Hancock. Further meetings are being arranged for February 19th, March 19th, April 16th and May 21st.

TRANSMISSION SECTION. Wednesdays, 5.30 p.m.

October 14*th*—Mr. P. E. Rycroft's inaugural address as Chairman.

November 11*th*—Informal discussion on "The Technical Implications of the Scott Report as applied to Electricity Supply," to be opened by Mr. J. A. Sumner.

December 9*th*—"Some Problems in Transmission Line Design," by Mr. A. Burke (to be presented on behalf of the author by Mr. J. J. O'Doherty).

Dates of later meetings of the Section are February 10th, March 10th, April 14th and May 12th.

WIRELESS SECTION.—Wednesdays, 5.30 p.m.

October 7*th*—Dr. R. L. Smith-Rose's inaugural address as Chairman.

November 4*th*—"A Study of Propagation over the Ultra-Short-Wave Radio Link between Guernsey and England on Wavelengths of 5 and 8 m. (37.5 and 60 Mc/s)," by Dr. R. L. Smith-Rose and Miss A. C. Stickland.

November 17*th* (Tuesday).—Informal discussion on "Plastics in Radio Production," to be opened by Mr. C. C. Last.

December 2*nd*—Particulars to be announced later.

January 19*th* (Tuesday).—Informal discussion on "Quartz Crystal Applications," to be opened by Capt. C. F. Booth.

Dates of later meetings are February 3rd, March 3rd, April 7th and May 5th, with informal meetings on Tuesdays, February 16th, March 16th and April 20th.

Oil Circuit-Breaker Maintenance

Notes on the Care of Low-Voltage Types

By A. E. Norris
(Director, J. G. Statter & Co., Ltd.)

TOO many oil circuit-breakers are in service which have not received much attention since they were installed. Such neglect is, in the main, due to their reliability, but no matter how good the design may be, failure to keep the gear in good condition will impair its efficiency and may lead to ultimate breakdown.

During the past few years large numbers of breakers have been installed in new factories where the size of the installation does not justify a qualified full-time electrical engineer being employed, and in such circumstances a reputable firm of electrical contractors might make periodical visits to inspect the electrical plant and switchgear that controls it.

All oil-immersed circuit-breakers should be inspected and tested at least once every twelve months, preferably every six months, even though they have not been called upon to break circuit. The time interval between inspections is, however, mainly governed by the conditions on site and frequency of operation, so that no hard and fast rules can be laid down. Where the switchgear is installed in a humid atmosphere, or subject to chemical fumes or excessive dirt and dust, then obviously more frequent attention should be given, especially immediately after a breaker is called upon to open a fault.

Record cards should be kept of dates of inspection and details of maintenance carried out, and whether any parts have been renewed. Some manufacturers supply a record card with each breaker.

British Standard Specification No. 936–1940 contains much useful information for users of low-voltage oil circuit-breakers.

When circuit-breakers are installed they should be placed in position and secured with their tanks on to safeguard the contacts from inadvertent damage. If stored in a damp place prior to installation, tests should be made with an ohmmeter. If any voltage coils or wiring are included, 5 megohms would be the average maximum, but the minimum satisfactory insulation resistance is 2 megohms.

After the incoming and/or outgoing cables are connected the breaker should be cleaned internally to ensure that any small pieces of packing materials, dirt, etc., are removed: hand bellows are useful for this purpose. Any excess grease should be removed from contacts and mechanism.

After opening on fault, phase barriers and tank linings, if fitted, should be examined as some charring or displacement may occur. If the oil has become highly carbonised the tank should be emptied and wiped out thoroughly, preferably with a chamois leather which has previously been soaked in clean oil. Waste should on no account be used for cleaning unless the tank is washed out thoroughly afterwards with clean oil, otherwise small fibrous particles may be left behind which may arrange themselves as a " bridge " between electrodes and thus cause breakdown. A certain amount of carbonising of the oil is not deleterious; the dielectric strength is not lowered thereby and may even be improved due to consequential reduction of the moisture content.

If facilities are not available for ascertaining the dielectric strength a rough and ready " crackle " test can be applied. This consists of plunging an iron rod of about ¼ in. diameter, heated to dull red, into a sample of the oil, when a distinct crackling sound will indicate the presence of moisture. The sample of oil to be tested should fill a clean and dry receptacle holding about half a pint, and the iron rod should be used to stir the oil thoroughly.

Alternatively, if more convenient, a sample of the oil can be placed in a clean and dry test tube about 5 in. long and ½ in. diameter; sufficient oil to fill one-quarter of the depth of the tube should be used. After ascertaining that the oil is not in an aerated condition the

MAINTENANCE CHART

Date Inspected	Serial No. of Breaker	Inspected by	Oil	Contacts	Mechanism and Trips	Remarks

Breaker Serial No.....has been tested and passed as satisfactory by Test Department.

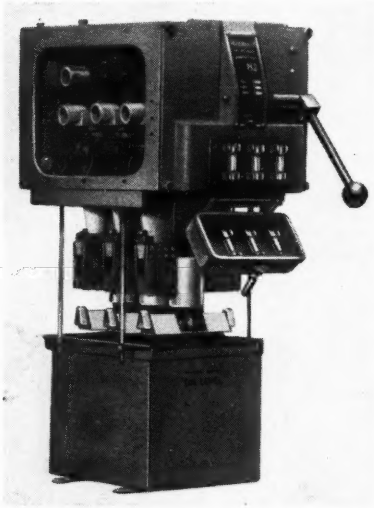
Date .....

Signed .....

test tube should be heated in a silent blue flame of a Bunsen burner until the oil commences to boil, during which time no crackling should be observable.

All working parts inside the switch tank should be wiped over to remove any deposit of carbon, or sludge. It is safer to renew the oil rather than operate the breaker with oil which is questionable. Class B.30 transformer oil should be used, which is practically colourless, but during wartime only " Pool " grade is available, which is equivalent to Class B.30.

Auxiliary sparking contacts which " make " first and " break " last are readily replaceable in the event of burning. If the burning is only slight then the metal may be faced up with a smooth file, but never with carborundum or glass paper, since these are liable to leave fine particles embedded in the metal which will cause heating under ordinary load conditions. After the sparking contacts have been touched up they should be tested for alignment and to ensure that the necessary



Statter Type " M.2 " three-pole, 400-A oil breaker with cable entry plate removed and time limit fuse cover open

lead on the main contacts is obtained. If the contacts are very badly burnt and the necessary lead cannot be obtained, they should be replaced. The fixed main contacts, mostly of the spring finger type, and main contact bar are unlikely to be damaged by pitting, but any slight marks can be removed by means of a smooth file.

With the breaker closed it should not be possible to insert a 0.0015 in. feeler gauge anywhere between the moving wedge bar and fixed contacts. If a feeler gauge is not available, a simple and even more effective check is to insert a thin cigarette paper between the contacts and then close the switch, after which careful attempts should be made to withdraw the paper without tearing it. If this is not possible, open the switch and then examine the area of the paper that has lain between the contacts, which should show marks of even pressure throughout the whole surface. The important factors are cleanness of the contact surfaces and the pressure applied.

Silver-plated contacts are fitted to the majority of breakers, and it should not be necessary to remove any surface film which may form, as this has a good electrical conductivity. If desired, however, the contacts may be cleaned with a good quality metal polish, after which they should be washed with clean oil.

The speed of closing may affect the damage done to contacts to a considerable extent. It cannot be too strongly emphasised that breakers must close as rapidly as possible over the latter portion of their stroke, and without hesitation.

Mechanism of Breaker

Adjustment of the mechanism should not be attempted unless its working is understood, otherwise permanent damage may ensue, necessitating thorough overhaul and replacement of parts. Normally no attention should be necessary, apart from periodical cleaning and oiling.

Good quality machine oil should be used for the lighter parts, such as the trip catch, which are required to return to position by their own weight. For bearings with greater loads a heavier oil should be used. Vaseline should be used for such bearings as those of fulcrum levers, where only limited angular movement takes place. It is essential to see that all parts work freely.

To ensure that it functions correctly the mechanism should be tested by means of the automatic releases fitted. By temporarily removing one of the screw caps from the overload calibration tubes and pushing a pencil upwards into the tube, thus raising the core, tripping on overload is simulated. Similarly, the under-voltage release can be held up by hand while the breaker is closed and, after being released, should trip the breaker.

Two forms of overload trip coils are fitted, according to ampere rating and the manufacturers' standards. With the series-wound whole current type it is only necessary to set all overload coils to the same desired tripping value. But 5-A current transformer operated trips are invariably shunted with time limit fuses, and it is essential to see that the overload setting is less than the fusing value of the fuses fitted. For this reason it is not possible

to fit time limit fuses having a lower value than the lowest value at which the breaker has been designed to trip, which normally corresponds to full load current.

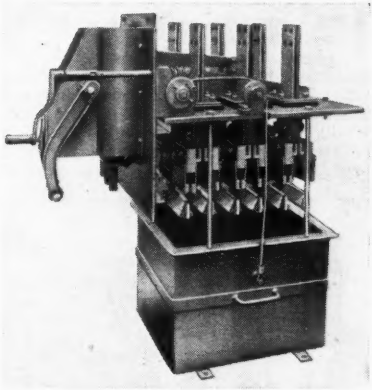
The fuse element may be found to deteriorate in course of time through continual heating and cooling. The gauge of fuse wire fitted is usually stamped on the metal ferrules. Time limit fuse curves can be obtained from the manufacturers.

Adjustable time lags, when fitted, should be set in accordance with the details contained in manufacturers' instruction leaflets.

Under-voltage trips do not normally need attention, but owing to ingress of some foreign body, or rough handling, hum may become apparent, due to the armature not being properly seated. After ascertaining that the release is free from dirt or pieces of packing material, slight adjustment to the spring tension may be made.

It is essential, when replacing any part, to ensure that contact nuts are tight, otherwise heating may occur at those points.

Instruments should not be interfered with, as manufacturers will not accept responsibility for any instrument returned with a broken seal. If it is necessary to remove any instrument which is operated from a current transformer, the latter's secondary windings must first be short-circuited as on no account must the secondary winding of current transformers be open-circuited under load. If an instrument is removed for any length of time the secondary winding should be left short-circuited until such time as the instrument is replaced. Instruments operated by potential coils, if disconnected, must be re-connected to the correct phases. Fuses for protecting the potential windings of instruments are normally fitted.



Statter Type "BM.2A" three-pole, 1,600-A breaker with oil tank raising and lowering gear for back-of-panel mounting

Isolating contacts, when fitted on draw-out pattern breakers, may be smeared with vaseline, or preferably with "Tecraphine."

Escape from Malaya

LAST week we reported that Mr. J. Gray, engineer and manager of the Teluk Anson electricity undertaking in Malaya had reached this country.

Mr. Gray informs us that from Ipoh down to Singapore the scorched earth policy was carried out very thoroughly. Although he was only about 120 miles from Penang, the first news received regarding the evacuation of that island was received in the news from London in the Far Eastern B.B.C. programme. From then onwards the position began to deteriorate rapidly. On December 26th last Teluk Anson was bombed and machine gunned and Mr. Gray visited the power station to find that although the plant was running perfectly there was no staff in attendance. Assistance was obtained from the military and three soldiers were left in charge with instructions where to put oil and how to regulate the voltage.

On December 27th four of the five generating sets were effectively put out of action. The Diesel engines were first run without lubricating oil or cooling water until the bearings ran and the engines seized up. The fuel pumps and nozzles were then smashed with 14-lb. hammers. The windings of the generators were hacked and cut with axes, all compressed air bottles were discharged and the compressor destroyed. Transformer windings were cut up and all transformer tanks were filled with water. The last generating set was treated in a similar manner before the final evacuation of the town on December 31st.

On reaching Kuala Lumpur Mr. Gray joined the Government Electrical Department and saw a good deal of the demolition in that area. The Bungsar power station was dealt with in a very effective manner. Couplings between the alternators and turbines were cut with oxy-acetylene gear, boilers were emptied of water and fired up until the boiler tubes, etc., collapsed with a roar, whilst every e.h.v. oil-filled bushing was shattered and the sub-station was destroyed. Rubber planters were not neglecting their duty and all the way from Teluk Anson to Singapore the sky was black with smoke from burning stocks of rubber.

At Singapore Mr. Gray joined the Air Ministry as station engineer at the civil air-port of Kallang. He left Singapore for Batavia a few hours before the fall, but before leaving carried out demolition at the air port.

He travelled from Batavia to Bombay *via* Colombo as a "distressed British subject," taking deck passages and made his way overland from Bombay to Karachi. At the latter port he signed on as assistant engineer in a 7,000-ton motor ship. On arrival at Capetown he was promoted to electrical engineer and finally arrived in England in this capacity just eight months after he left his home in Malaya.

Load-Limit Indication

A Simple and Compact Instrument

By H. C. Busbridge, A.M.I.E.E.

THE protection of the innumerable circuits radiating from street distribution pillars on low-voltage systems has always been a source of anxiety because the maximum load on these final circuits is an unknown quantity. It is therefore not surprising that most failures of supply to domestic consumers and small industrial concerns are attributable to this cause.

Accurate records of the connected load on each final distributor circuit cannot be kept, because consumers frequently fail to notify changes in the amount of installed apparatus, but even if this were possible, the information would be of little value in determining the maximum load of individual distributor sections owing to load diversity. For practical reasons, chiefly relating to space limitation and cost, neither load recorders nor maximum demand indicators of the conventional type can be installed in street distribution pillars.

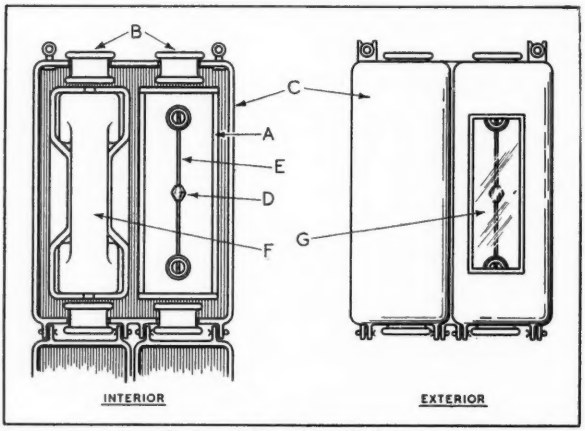
Many undertakings spend a considerable sum annually on making periodical tests with temporarily installed recorders, by systematic tong-testing and other means to ascertain the load on distributor circuits, but unfortunately all such periodical testing ignores the critical and vital factor, *i.e.*, ascertainment of the maximum load under abnormal conditions such as "cold snaps," coal strikes, or other contingencies which disturb the normal incidence of connected load on distributor sections.

The only solution of the problem is the installation in each distributor pillar of some inexpensive form of indicator on each circuit, to show whether the load has exceeded the safe current carrying capacity of each fuse or circuit-breaker. Practical considerations would require such an indicator to be very compact in design and inexpensive to construct.

I have been carrying out a considerable amount of experimental work with the object of designing an indicator which fulfils these requirements, and believe that the simple form of load indicator here described affords a satisfactory solution of the main problem under consideration.

A device suitable to meet the main requirements of giving an indication when the loading on any specified circuit has attained or exceeded a predetermined limit, may be constructed by vertically mounting a tinned-copper wire of suitable gauge between a pair of terminals and soldering at the middle of the wire a correctly proportioned metallic bead. Under working conditions this device would be connected in series with the main fuse or circuit-breaker, and the metallic bead would fall to the bottom of the wire when load conditions caused the temperature of the wire to approximate to the fusing point of the solder, this temperature being much below the fusing point of the wire itself. In tests with wires of various gauges and with suitably proportioned current densities the device has worked infallibly in all cases.

The indicator can be mounted in a case for use as a portable unit or mounted as a unit in substitution for the neutral fuse on certain existing types of branch single-pole cut-outs. Alternatively, it could be made up in an iron or bakelite case as a separate unit for permanent installation or combined in one case with a fuse which would, of course, be connected on the live side.



Design of thermal load indicator

A. Asbestos-lined compartment. B. Insulating bushes. C. Metal or bakelite case. D. Soldered metallic bead. E. Thermal element of tinned copper wire. F. Home Office pattern s.p. cut-out or calibrated cartridge fuse. G. Window.

Bomb Damage

Effects on Power Plant

DURING recent months we have published several articles on the effects of bombing on this country's electricity supply system. In an article published in the Canadian journal, *Electrical News and Engineering*, Mr. J. N. Waite, manager for South-East England Central Electricity Board, has been permitted to go into further details, particularly in relation to generating plant. It is stated in this that although complete destruction is confined to quite a small area, minor damage from blast and flying fragments can be experienced over quite a wide radius. Apart from a direct hit the chief danger is from flying bomb fragments, which have high enough velocity to pass through steam pipes, machine casings, switch tanks, etc.

A large amount of extra security can be readily obtained by relatively simple local protection. As regards power stations, it was decided to have local protection round all turbo-alternator sets from 30,000-kW capacity upwards and to divide engine-room basements and auxiliary plant rooms by bulkhead brick cement walls. In all cases glass skylights and windows are a real danger and have been removed. In order to deal with oil fires from punctured oil pipes and tanks of turbines, transformers, reactors, etc., adequate fire-fighting appliances should be immediately available. With a staff of firewatchers, proper access to all parts, and adequately trained firefighters, the danger from incendiaries can be reduced to negligible dimensions.

Loss of "Blackout"

Near misses will remove all glass, doors and roofs, and then, of course, under blackout conditions it becomes very difficult to operate the plant at night. This has not mattered a great deal in this country, since nearly all power stations are connected to the grid and it has usually been convenient to keep plants that have lost their blackout shut down during the hours of darkness, until it could be replaced. Steel-frame buildings stand up well, but brickwork supporting heavy weights is particularly dangerous since if one side gets blown in the whole structure collapses. Wooden cooling towers are particularly susceptible to damage by blast but the reinforced concrete hyperbolic type stands up well.

Generally speaking there has not been much serious damage done to generating plant, though, of course, at times some important units have been out of commission for a short while. In fact, more plant was put out of use by damage to cables than by damage to plant. What damage was done was put right very rapidly in most cases.

At the present time out of a total capacity of nearly 9,000,000 kW of plant only 55,000 kW, or less than 1 per cent., is out of commission due to war damage. During the height of the raids there was sometimes a considerable amount of plant unusable for short periods, up to nearly 700,000 kW, but it was mostly superficial damage and the bulk was brought back into service quickly. It was always possible to meet the load and that was what mattered. The longest time any town has been without a supply is just over four days, and this has only occurred in three cases. In all other cases supply has been on again before the next night or within a 24-hour period.

Trouble with Cables

The most serious damage experienced has been that to underground cables. They take longer to repair than overhead lines, especially the higher-voltage cables, which are oil or gas filled. In one case over a thousand tons of debris had to be removed before the cables could be reached. As there are many other public utilities with services laid underground, there is often competition as to who shall get to work first. Usually electricity gets priority but this is not pressed unduly unless it is really immediately essential.

Overhead distribution has stood up extremely well. No towers have been completely destroyed, and of the three main war hazards, bombs, barrage balloon trailing cables and aeroplanes crashing into lines, the last two have caused far more faults than bombs. Lines can be repaired so quickly that they do not rank as a serious hazard. The serious damage arises from switchgear, transformers and reactors.

In general no attempt has been made to supply extra guards to outdoor switchgear, although in some important cases barrier walls have been built, because switch tanks offer a relatively small area to damage and very few outdoor switches have been lost. Reactors and transformers have been enclosed with brick cement mortar walls and these have proved sufficient to safeguard against serious damage. In one instance a heavy bomb fell within about 20 yd. of the walls, and caused no serious damage.

Mr. Waite is sure that the balloon barrages have played an important part in preventing serious damage to power stations. At times the breaking loose of balloons has caused many faults due to trailing cables, but there

is less trouble now, the balloons being equipped with a ripping device which causes them to deflate when they break loose and so come down quickly.

Mr. Waite expresses the view that the electricity supply industry has stood up to wartime conditions much better than anyone would have believed possible. The good performance of the industry has only been possible because all concerned sank their own sectional interests to promote the common good.

PARLIAMENTARY NEWS

By our Special Reporter

Economy and Fixed Charges

IN the House of Commons on September 8th, Sir Adrian Baillie asked the Minister of Fuel and Power if he was aware of the continued waste of electricity resulting from agreements which provided for minimum charges; and whether some arrangements could be made whereby any difference between the charge for electricity actually consumed and the minimum charge would be shared equally by the supplying company and the consumer whose patriotism had resulted in his consumption being less than the minimum.

Major Lloyd George said he was aware of a considerable volume of complaint from consumers who, having reduced their consumption, found themselves called on to pay a minimum charge. He had given this matter careful consideration, in consultation with the industry, and hoped to make an announcement on the subject very shortly.

Reduction on N.E. Coast

Sir Percy Hurd asked the Minister of Fuel and Power whether he was aware of the material reduction of consumption reported by the North Eastern Electric Supply Co. in 22 areas in different parts of the country; and what was the estimated reduction in the country generally.

Major Lloyd George said he had seen the Press statement referred to which related to the June quarter. He was not at present in a position to give the estimate asked for in the second part of the question, but he hoped to have some information available shortly for the country generally.

Five-Watt Lamps

On September 9th Mr. Thorne asked the President of the Board of Trade why 5-watt lamps were not being made, as they would be the means of saving electricity; and what action he intended taking in the matter.

Captain Waterhouse said that the production of lamps of less than 15 watts involved so much skilled labour and machine capacity that, in consultation with the Minister of Fuel and Power, the President of the Board of Trade had decided that their manufacture was not justified by the very small saving of fuel which their use would effect. The output of lamps of 15 and 25 watts could not, for technical reasons, be increased.

Wireless Service Engineers

On September 10th Sir Alfred Knox asked the Minister of Labour, in view of the essential nature of wireless sets in wartime, whether he would exempt skilled radio engineers from further call up in order that they might cope with the large number of sets requiring repairs.

Mr. Bevin said he appreciated the importance of making provision for the maintenance of wireless receiving sets. Applications for deferment in respect of wireless repairers or mechanics were granted to the extent necessary to ensure adequate servicing facilities in the locality. Men not granted deferment were either called up for the Services in their trade capacity or were transferred to other work in their own occupation.

Technical and Scientific Advice

Replying to questions on September 11th, Sir Stafford Cripps (Lord Privy Seal) said that the appointment of three distinguished men to the staff of the Minister of Production as whole-time scientific advisers did not affect in any way the functions of the Scientific Advisory Committee or the Engineering Advisory Committee of the War Cabinet. No doubt in appropriate cases these committees would consult with the Minister of Production's scientific advisers before submitting recommendations.

Chinese Engineering Students

On September 11th, Mr. Dugdale asked the Foreign Secretary if he was aware that examinations were being held in China for students anxious to come to this country to take advanced courses in engineering, economics and other subjects and whether the British Government would invite the successful students to be its guests.

Mr. Eden said that he had had no confirmation of reports which he had seen on this subject, but arrangements were under consideration whereby Chinese students would be brought to this country for post-graduate courses under the auspices of the British universities, the Universities' China Committee and the British Council.

Loose Coppers for the E.I.B.A.

A PRACTICE has been introduced at some association meetings whereby those present instead of putting a penny in the collecting plate for the Electrical Industries Benevolent Association at the close of the meeting, give all the loose coppers in their pockets. This may mean that a member will get off scot-free, but the probability is that it will cost rather more than one penny ; but, if it does, the result will not be ruinous for the individual, and a very good cause will benefit.

CORRESPONDENCE

Letters should bear the writer's names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

"Profitable Usage"

YOUR comment on Mr. J. Ratcliffe's letter in the correspondence section of September 11th, seems to me remarkable. Efforts to save coal by the efficiency of utilisation, must inevitably lead to the furthering of progress in industry, and the comfort of the individual, which you rightly desire. Conservation of our national heritage, is a prime consideration, by reason of the fact that it is a wasting asset. How then can this policy be held to be derogatory, in the sense of "hoarding"?

Your statement, attributing the increased consumption of electricity, to the people's choice of the most suitable way of using coal, does not represent the facts as I see them. Industrial and domestic consumers alike, are primarily concerned with cost and convenience to themselves and in both instances, competitive prices coupled with the adaptability and convenience of electricity over any other medium of power, has proved the deciding factor. It is not necessarily the business of either type of consumer to concern himself with how coal is used, when considering his requirements of power supplied by public utility companies; whilst the domestic consumer is rarely in possession of sufficient knowledge to pass judgment, assuming he wished to do so.

It is only a national emergency of the present magnitude, which gives any hope that those interests directly connected with the use of coal, may adopt means whereby greater efficiency could be obtained by a combination of competitive processes.

*Park Royal, N.W.*10. C. E. SHEPPARD, Grad.I.E.E.

An Engineer's Headache

LIKE every other conscientious borough electrical engineer I have collected over a period of time, more or less the whole of the legislation dealing with electricity supply and, by dint of continuous reference to these Acts and Regulations and so forth, have become an amateur lawyer of a kind. A fair measure of usage to the wordiness of the law has, therefore, stood me in good stead when ploughing through the mass of Statutory Rules and Orders which commenced with the Defence Regulations, 1939, and have never ceased to flow since that time.

At the outset, may I take my hat off to those who have had the task of handling these matters so far as the electricity supply industry is concerned; the least one can admit is, that great change has been effected with very little opposition or criticism. I often think that commentators in the Press and elsewhere who have complained of lack of realisation that there is a war on, have failed to appreciate this absence of complaining criticism for what it really is, namely, a deep-rooted desire to get on with the job and a definite decision to forgo the pleasure of howling at every opportunity.

However, it is very difficult at times not to fall back into past bad habits and whether I am correct in my assumption or not, I believe I am stating an opinion which would be backed up by many of my contemporaries, when I voice a complaint about the manner in which much of the material of the Statutory Rules and Orders is presented.

Let me take for example, the Essential Work (General Provisions) Order, 1942 (No. 583). This is a comparatively simple set of modifications to the original Order of 1941, No. 302. Before I could read No. 583 with any hope of a clear grasp of what these modifications meant, I had eventually to hand the two over to an assistant to take the old Order 1941, No. 302, and alter it in ink to see how and in what parts the old Order was affected. This was not a great task, but before it was done I had wasted my time in the first instance after endeavouring, with the usual stream of interruptions, to compound the two Orders mentally into one, and in the second instance, the assistant's time in adding the modifications to the original Order. Incidentally, there were further modifying Orders, Nos. 1942, 371, 687 and 1413, but these were not very disturbing.

Fortunately, recently a new Essential Work (General Provisions) Order, 1942 (No. 1594) was issued reprinting the whole thing, but unfortunately, again a careful comparison has to be made with the original Order and modifying Orders to find out what further had been added.

There are a number of similar cases to the above, but I think one of the best, or perhaps worst, examples is represented by the latest modifying Orders, 1942, Nos. 840 and 1655, to the original Fire Prevention (Business Premises) (No. 2) Order, 1941 (No. 1411). It seems to me that one must have the disposition of the Archangel Gabriel not to lose patience with the manner of setting out the legal instructions as to what has to be done by literally thousands of laymen at a date not later than September 14th, 1942. 1942 No. 1655 modifies 1942 No. 840, which modifies 1941 No. 1411. Therefore, after a struggle, I once again handed the lot over to my assistant to re-write the whole of the 1941 No. 1411

with the modifications in their correct places, so that in the short time at my disposal I can read it with some hope of understanding it.

I wonder how much time is wasted by persons similarly placed to myself in unravelling these crossword puzzles. I have come to the conclusion that a Statutory Rule and Order ought to be issued which forbids the issue of Statutory Rules and Orders modifying a previous issue unless the whole Order is reprinted with the latest modifications shown in italics.

Finally, while I am quite prepared to face the criticism that my capacity is below normal, I curse the legal draughtsman who produced the passage 4 (*aa*) of 1942 No. 840 which gives the Civil Defence Tribunal power to exempt persons from fire-fighting duty on the grounds that it would be an exceptional hardship, but not on the grounds that he or she was doing long hours on vital work (1 (7) of 1942 No. 1655 which becomes 4 (1B) (*a*) and (*b*) of 1941 No. 1411) this privilege to do so being the appropriate authority (4 (*g*) and (*gg*) of 1942 No. 840 and (*ggg*) of 1942 No. 1655).

Southwark, S.E. F. S. NAYLOR,
Electrical Engineer & Manager.

A praiseworthy attempt to relieve electricity supply engineers of the Sisyphean labour of keeping up to date with wartime legislation is made in the summary prepared by Messrs. Leslie Gordon and J. W. Simpson, a further supplement to which has just appeared.—*Editors, Electrical Review.*]

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT is announced that **Sir Frank Smith** has resigned from the position of Controller of Telecommunications Equipment to the Ministry of Aircraft Production which he has held for over two years, during which great advances have been made in radiolocation. For his services he was created a G.C.B. in the New Year Honours List. He is to devote his attention mainly to other calls on his services affecting the R.A.F. At present he is carrying out a special mission on behalf of the Minister of Aircraft Production, to whom he has offered his future help and advice.

Sir Frank Smith

Sir Robert Renwick

Sir Frank Smith is succeeded by **Sir Robert Renwick** as Controller of Communications and Sir Robert has also been appointed to a new post, Controller of Communications Equipment in the Ministry of Aircraft Production, and to the Aircraft Supply Council. In both these positions he will be assisted by **Sir Robert Watson Watt,** who is Scientific Adviser on Telecommunications at the Air Ministry and will be vice-controller at the Ministry of Aircraft Production. Sir Robert Renwick is chairman of the County of London Electric Supply Co. & associated concerns.

Mr. R. T. Smith, general manager of the Glasgow Corporation Transport Department, retires under the superannuation scheme on January 22nd, and the Transport Committee has agreed unanimously to nominate for the post the present assistant manager, **Mr. E. R. L. Fitzpayne.** The Committee's recommendation will come before the Corporation for confirmation at its next meeting. The salary scale for the position is £1,500 to £2,000 a year.

Sir Charles Wright, who has been Controller of Iron and Steel since January, 1940, has resigned that position on account of ill-health. He is succeeded by **Sir John M. Duncanson,** who has held the post of deputy-controller since September, 1940.

The Stalybridge, Hyde, Mossley and Dukinfield Joint Transport and Electricity Board has been asked to allow its chief engineer, **Mr. J. Harwood Lumsden,** to supervise the Ashton-under-Lyne electricity works, owing to the resignation of **Mr. P. Bregazzi,** the borough electrical engineer. Ashton Council has made the request pending the appointment of a successor to Mr. Bregazzi.

The Cheadle and Gatley Urban District Council at a recent meeting ratified the decision of the Electricity and Lighting Committee to continue the appointment of **Mr. B. J. Russell** as acting engineer and manager for the duration of the war or later, at a salary of £700, rising to £825.

Mr. B. E. Williams is relinquishing the position of joint managing director of Turner & Newall, Ltd., as from October 1st, upon his retirement from active business; he will remain on the board of the company. **Mr. W. W. F. Shepherd,** joint managing director, has been appointed deputy chairman, and **Messrs. H. Hanson, R. G. Soothill** and **G. Wilson** have joined the board.

The annual golf competition organised by the Mersey and North Wales (Liverpool) Centre of the Institution of Electrical Engineers in aid of the Benevolent Fund was held at Prenton Golf Club on May 16th, 1942, under the direction of **Mr. E. G. Taylor,** B.Sc. (Eng.), M.I.E.E. A very enjoyable day was spent and all those taking part will be interested to know that a cheque for £200 has been forwarded from the Centre. The good result of this effort

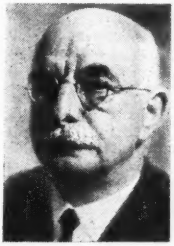
is due to many friends who sent donations, and constitutes a record for Merseyside.

Sir Eugene Ramsden has been appointed deputy chairman of Thomas Bolton & Sons, Ltd., and Messrs. D. W. Aldridge, W. G. Hendrey and W. H. McFadzean have been appointed to the board of the company.

Mr. E. W. Dorey, the consulting engineer, informs us that he is now carrying on his business from " Delancey," 10, Beech Hill, Hadley Wood, Barnet (telephone: Barnet 4950).

Obituary

Mr. Charles Procter Banham, whose death on August 28th we briefly recorded in our last issue, had been a member of the British Thomson-Houston Co.'s commercial engineering staff for the past twenty-six years. He was born at Scarborough in 1868 and received his technical education at University College, Bristol. In 1887 he entered the works of Stothert & Pitt, Ltd., at Bath and four years later, after studying electrical engineering at the Royal College of Science and the City and Guilds, London, he joined the engineering staff of the Brush Electrical Engineering Co., Ltd. With that company he carried out some of the early experiments in the electric lighting of trains on the " Sud " Express, and in 1892 when the Brush Co. sold its French patents to Alexandre Grammont, Mr. Banham went over to organise the factory at Pont-de-Cherin, Isére, and to act as chief engineer. In 1894 he returned to England as assistant manager at the Brush Co.'s works at Loughborough, and two years later he went to South Africa as mechanical and electrical engineer to the Table Bay Harbour Board. He was appointed electrical superintendent of the South African Railways and Harbours in 1911, but relinquished that post in the following year to become manager of the Durban office for the South African General Electric Co. While in South Africa Mr. Banham played a leading part in the formation of the South African Section of the Institution of Electrical Engineers, of which he was chairman for two years and later secretary of the Cape Town local section. Returning to England in 1914, he became manager of the Aldershot & District Traction Co., and in July, 1916, he joined the staff of the B.T.H. Co. at Rugby. For sixteen years he was in the Contract Department, but for the last ten years he represented the company on certain committees of the B.E.A.M.A.



The late Mr. C. P. Banham

Mr. G. Hailey.—We regret to learn of the death of Mr. Guy Hailey, M.I.E.E., A.M.I. Mech.E., of the Hong Kong Electric Co., Ltd. Mr. Hailey, who was a member of the Volunteer Defence Corps, was a prisoner in Japanese hands.

Mr. O. Mueller.—The death occurred on September 13th, at the age of fifty-three, of Mr. Otto Mueller, managing director of the Pressed Steel Co. of Great Britain, Ltd. Mr. Mueller was an American.

Mr. J. M. Evans, B.Sc.(Eng.).—The death occurred at the Royal Victoria Hospital, Montreal, on July 28th of Mr. John M. Evans, assistant manager (development) of the Shawinigan Water & Power Co. Mr. Evans, who was only thirty-six, was a Londoner by birth, but was brought up in Canada. He had been on the staff of Shawinigan Water & Power since 1929 and was concerned particularly with studies of desirable industrial locations and the development of new and increased power outlets. Since last year he had been executive chairman of export control for the Canadian Government and had organised a department to facilitate application of the control. He made recommendations to remedy considerable confusion and uncertainty which had developed in connection with the issuing of export permits, and generally co-ordinated this phase of wartime control. In the summer of 1939 he was a member of the Canadian Manufacturers' Association delegation which came to London to explore how and to what extent Canadian industry could best serve this country in the production of war equipment and supplies. The returning party had not reached Canada when war was declared.

A.S.E.E. Meetings

THE following programme of London meetings has been arranged by the ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS for the 1942-43 session :—

October 20*th*, 6.15 p.m.—Presidential address by Mr. H. W. Swann.

November 14*th*, 2 p.m.—" Infra-Red Heating for Paint Drying and Other Industrial Applications," by Mr. F. E. Rowland.

December 12*th*, 2.15 p.m.—" Supply," by Mr. J. I. Bernard.

January 9*th*, 2.15 p.m.—" Distribution," by Mr. J. S. Blacklock.

February 13*th*, 2.15 p.m.—" Installation," by Mr. J. Flood.

March 16*th*, 6.15 p.m.—" Industry and Education," by Dr. F. Dunsheath.

April 20*th*, 6.15 p.m.—" Repair and Emergency Work of a Maintenance Engineer," by Mr. J. Southern.

May 18*th*, 6.15 p.m.—Three winning papers from the branch papers competition.

The meetings will be held at the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2, with the exception of the one on November 14th, which will be held at Magnet House, Kingsway, W.C.2.

I.E.E. Students' Dance

THE Bristol Students' Section of the Institution of Electrical Engineers is organising a dance in aid of the Institution Benevolent Fund to be held at the Victoria Rooms, Bristol, on September 30th from 6.30 to 11 p.m. As many people will be unable to attend, the Committee has made available token tickets at 3s. each, which will be a direct donation to the fund. They can be obtained on application to the honorary secretary, Mr. J. W. Dorrinton, 45a, Trelawney Road, Cotham, Bristol, 6.

COMMERCE and INDUSTRY

Comprehensive Wages Demand. A.R.P. Guide for Industry.

Engineers' Wage Claim

A MEETING representative of 38 engineering and shipyard trade unions held last week at Blackpool, where the Trades Union Congress has been in progress, decided to apply for a substantial all-round increase in wages and to make a special claim for plain-time workers. Altogether some 1,500,000workers are concerned.

It may be recalled that last June at the conference of the Amalgamated Engineering Union, also held at Blackpool, a resolution was passed that immediate application should be made for wage increases for all members employed in all branches of the engineering, shipbuilding, ship-repairing and allied industries.

Retail Trade Wages

The National Joint Industrial Council for the Retail Furnishing and Allied Trades (which, *inter alia*, covers the retailing of electrical goods) has sent us details of increases in wages which are to come into force on September 21st. For branch managers and manageresses they range from 3s. to 5s. a week. For male employees aged 21 or over the increase is 3s. a week, for those between 18 and 21, 2s. per week, and under 18, 1s. 6d. a week. The corresponding rises for female employees are 2s., 1s. 6d. and 1s. per week respectively.

Emergency Legislation

Supplement No. III to the " Summary of the Emergency Statutes, Regulations and Orders affecting the Electricity Supply Industry," compiled by Mr. Leslie Gordon (London J.E.A.) and Mr. J. W. Simpson (I.M.E.A.) has been published, price 2s. 6d. As before, the index is brought up to date to form a complete guide to the whole series. The supplement takes account of the transfer of electricity supply affairs from the Ministry of War Transport to the new Ministry of Fuel and Power, and the hope is expressed that before the end of the year the summary will be re-edited and re-issued. Copies may be obtained from Mr. Simpson, at Wellington House, Strand, W.C.2.

War Emergency Cable Sockets

With a view to effecting the maximum possible economy in the use of brass and solder, the dimensions of the cable sockets prescribed in B.S. 91–1930 have been reviewed and a war emergency revision of the specification has just been issued by the British Standards Institution.

There are two main types of socket in general use, namely the hot pressed or cast type and the tubular type. In B.S. 91–1930 each size of socket is related to a particular size of cable. In the case of the hot-pressed or cast type the new specification secures the desired economy by so altering the bore diameter that a socket one size smaller than previously can be used for a given size of cable. In this way no alteration of tools is necessary for the manufacture of the sockets, as the hole for the cable is drilled after manufacture. In the case of the tubular sockets the economy is achieved by reducing the thickness of the tube from which the socket is made. This would necessitate alterations to tools were it not for the fact that tools for the manufacture of light-gauge sockets already exist, many users of cable sockets having been of the opinion that the tubular sockets prescribed in B.S. 91–1930 were unnecessarily heavy. As an alternative to reducing the thickness, the length of the socket can be reduced, and a new range of standard sockets has, therefore, been introduced in the war emergency revision.

Copies of this revision slip may be obtained gratis from the British Standards Institution, 28, Victoria Street, S.W.1, on receipt of a stamped addressed envelope.

Nottingham and Reconstruction

The Nottingham Society of Engineers has been invited by the City Corporation Post-War Reconstruction Committee to co-operate in considering the engineering aspects of reconstruction. Together with delegates from kindred engineering societies a joint committee has been formed and a whole-day conference has been arranged for next Sunday, September 20th, at the University. At this conference fourteen papers will be presented dealing with gas, electricity, water supply, sewage, transport, domestic heating and ventilating, building construction, roads, refuse collection and disposal, planning, lighting, coal industry and welfare in industry.

Industrial A.R.P.

Industrial Bulletin No. 2, prepared by the Ministry of Home Security, has been published by the Stationery Office. These Bulletins which contain information obtained under raid conditions are intended to assist industry and commerce to keep their air raid precautions schemes up-to-date in Civil Defence technique. They are for sale on a restricted basis. Copies can be obtained, price 9d. each, on written application to H.M. Stationery Office, York House, Kingsway, London, W.C. by clerks to local authorities or county councils, the principals of public utility companies, industrial or commercial concerns or of institutions, or by county secretaries of the St. John Ambulance Brigade, the British Red Cross Society and St. Andrew's Ambulance Association.

American Plan for Saving Rubber

A report on the rubber situation in the United States which has been prepared by a committee of inquiry was handed to President Roosevelt last week and has now been passed on to Congress. The committee recommends the complete reorganisation and consolidation of Government agencies concerned with the rubber problem. It is noted that restrictions placed on the use of petrol are not due to any scarcity of petrol, but are required wholly for the purpose of saving rubber. Such restrictions must be extended over all the country, and should be directed by

a national administrator with full responsibility. President Roosevelt, in an accompanying letter, states that the recommendations will be put into effect as soon as arrangements can be made.

Kelly's "Merchants" Directory

Kelly's Directory of Merchants, Manufacturers and Shippers for 1942 has just been published. (Kelly's Directories, Ltd., price 60s.). This directory has for long been regarded as an indispensable work of reference to commercial firms whether their interests lie at home or abroad. The work this year again consists of one volume instead of two as it is, of course, still impossible to publish the usual volume dealing with countries outside the British Empire.

The larger part of the book deals with the British Isles and is divided into three parts (1) England, Scotland and Wales, except London, (2) London, (3) Ireland. The next section is devoted to the British Empire and the arrangement and indexing of the whole book is such that it is a simple matter for the user to find the particular information which he requires.

Lamp Publicity

For the 1942–43 lamp season the display material of CROMPTON PARKINSON, LTD., includes a new and attractively modelled window piece for Crompton lamps in full relief and in colours. It measures approximately 30 in. by 18 in. with a depth of 6 in. and displays a Crompton lamp supported by a girl and a workman standing on a bronze base bearing prominently the words "On National Service."

The new Crompton lamp window display piece

Immediately below the girl, the plaque of the base shows a woman busy sewing under the word "Home," while the scene under the figure of the man is that of "Industry," the bas-relief group of workers being actively engaged in the manufacture of munitions. By means of a slightly curved backpiece the figures of the girl and man are made to stand out in life-like manner.

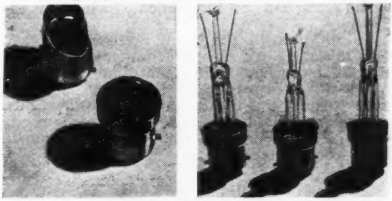
A model display on similar lines for "Kye" lamps will also be available. The centre-piece shows a woman reaching up to insert a lamp in the socket. The background, shaped like a lamp, bears the phrase "Kye in the Socket Saves Your Pocket." The display bears a tablet drawing attention to the fact that the price is still 1s. plus purchase tax. Its size is very much the same as the Crompton display. Other material includes a Crompton cardboard cut-out with overall dimensions of 9 in. by 6½ in. and printed in three colours, and a Kye cardboard cut-out measuring 7½ in. by 7 in. Their striking designs and convenient sizes make these cut-outs suitable for either window or counter use.

The Crompton lamp national and provincial Press advertising is designed to support the Ministry of Fuel campaign for economy. The illustrations, which are somewhat novel in their treatment, give examples of how electricity can be carelessly wasted. The slogan throughout the campaign is "Crompton Lamps Help you to go Lighter with Your Lighting." The Kye lamp is also being advertised in the national and provincial Press.

Salvage of Lamp Caps

As it is some time since we reproduced instructions circulated by the Electric Lamp Manufacturers' Association for the salvage of lamp caps, and as the need is now even greater we think it may be helpful to repeat the suggested procedure given in our issue of January 10th, 1941.

The hands should be protected from splinters of glass by thick gloves and it is also advisable to wear goggles for the protection of the eyes.



The correct way to return lamp caps is shown in the right-hand illustration. The glass stems should not be removed as in the left-hand picture

With the lamp held in the left hand by the cap, the glass should be struck sharply with a screw driver, file or similar tool half an inch or more away from the brass. The glass foot and all interior cement should be left intact as this provides reinforcement against crushing and denting. Caps in this condition should be packed into barrels or other *rigid* containers (not sacks), the gross weight of which should not exceed 2 cwt. per package. They should be sent to any branch of an E.L.M.A. member.

War Damage Insurance

The Board of Trade has decided, with the approval of the Treasury, that the premium payable under the Business Scheme of the War Damage Act, 1941, for the whole year to September 30th, 1943, shall not exceed £1 per cent. For the period of six months up to March 31st, 1943, the rate of premium will be 10s. per cent. and will be payable in one sum. The rate of premium for the subsequent six months will be determined in March next and will not exceed 10s. per cent.

Location of Retail Businesses Order

In order to clarify a point in S.R. & O. 1942 No. 1619, paragraph (2) of Article 2 has been amplified by an Amending Order (S.R. & O. 1942 No. 1828 which will be available shortly from Stationery Office, price 1d.) and now

reads as follows :—" Nothing in this Order shall prohibit any person from carrying on at any premises any business which he was carrying on at those premises on August 20, 1942, and the goodwill of which he had acquired by operation of law or otherwise from a person who carried on such business at those premises during the basic period, December 1, 1940, to October 23, 1941, or a part of the basic period."

Switch Makers' Jubilee

It had been intended to mark the golden anniversary of J. H. Tucker & Co., Ltd., by the issue of a souvenir book. Data, anecdotes, photographs and personal memoirs historically arranged had been in course of collection and preparation for nearly ten years. Unhappily all those intimate records are gone and are irreplaceable. Thus, the golden jubilee book cannot be issued, but even now the company is building up copy for the diamond jubilee issue and wishes to hear from all ex-Tucker men and women so that during the next few years contact with them can be established with a view to rewriting the story of what is now an important section of the electrical industry which has had no permanent record of its progress.

In addition to the many well-known men who have figured in the company's history, women have had a big share in the story, which is not surprising in view of the fact that quite early in this century and before the value of female labour was nationally recognised, over 70 per cent. of the operative personnel were women and girls.

Twenty-five Years

In the stress of present-day conditions events which in normal times would be the occasion for celebration pass almost unheeded. Wild-Barfield Electric Furnaces, Ltd., has just passed the twenty-fifth anniversary of its formation, but existing conditions make it impossible to do more than to place this event on record and to offer our congratulations. The company was formed during the last war, and was based on technical collaboration between Mr. L. W. Wild and the late Mr. E. P. Barfield in connection with the then national effort. The contribution made by the company in the field of electric heat treatment is now well known in the industry, and when the story can be told, the important part played by it during the present war will be revealed.

Substitute for V.I.R.

Efforts are being made to find satisfactory substitutes for rubber-insulated cables. One of the possible alternatives for internal wiring at 250 V is the use of paper insulation, and as such cables have not been included in any previous B.S. specification, a war emergency standard has now been issued.

Seven sizes of conductor, ranging from 0.0015 to 0.0225 sq. in. are included, the types of cable being single-core, flat twin and flat three-core. Details of earth-continuity conductors are also given, although their inclusion or omission is optional. The minimum thickness of insulation, the thickness of lead sheath, and the nominal overall dimensions are tabulated. The specification also deals with the voltage test and the method of identification of cores. Copies of this specification (B.S. No. 1068) may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 1s. 3d., post free.

The Building Centre

By arrangement with the Royal Institute of British Architects, the Building Centre has taken over the Maddox Galleries which were formerly part of the old building of the R.I.B.A. Exhibits have been transferred from the temporary premises occupied in the Polytechnic Extension and are being added to considerably by manufacturers. The Centre will work in collaboration with the Ministry of Works and Planning, the Building Research Station and other technical organisations, and will maintain an exhibition of materials and equipment as heretofore but with a special bias towards present and post-war needs.

A gallery is being reserved for lectures and temporary exhibitions of national importance will be arranged from time to time. The address is 23, Maddox Street, W.1. (Mayfair 2128-9.)

Trailing Cables in Mines

Mr. J. R. Felton, Deputy Chief Inspector of Mines, in his report on the cause of the explosion at Barnsley Main colliery last February, in which 13 men lost their lives, attributes the disaster to firedamp ignited by a flash from an electric coal-cutter trailing cable. The cable and its connections, he says, are " the most vulnerable part of an electrical apparatus as now used underground." The matter of the design, construction and use of trailing cables is one requiring further investigation, and he suggests that, as soon as circumstances permit, a committee should be set up for that purpose, on which cable makers, electrical experts and managers should be represented.

Accident at Power Station

At Wallasey Police Court on September 9th Wallasey Corporation was fined £10 for an alleged infringement of the Factories Act by not securely fencing transmission machinery at the Poulton generating station. It was stated that an electrician was attending to the greasing of a motor and was in the act of replacing a grease cap when his left hand slipped downwards into the intake of gears which drew in his arm and tore it off at the elbow.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following :—

UTILO cooker, maker or agent.

Anti-vibration lampholder with letters MPC moulded on plastic base.

Post-War Planning

The Uthwatt Committee and Public Utilities

EARLY in 1941 Lord Reith, then Minister of Works and Buildings, appointed an expert committee, under the chairmanship of Mr. Justice Uthwatt, " to make an objective analysis of the subject of payment of compensation and recovery of betterment in respect of public control of the use of land " and " to advise, as a matter of urgency, what steps should be taken now or before the end of the war to prevent the work of reconstruction being prejudiced." An interim report was published by the Committee in July, 1941, in which it laid down the principles upon which compensation for the compulsory acquisition of land should be based, and recommended control of undeveloped land and the preparation of reconstruction schemes in respect of developed land. It acted on the assumption that there would be a national planning policy with a central planning authority.

Conjoint Conference Memorandum

Some time after the appearance of the report a memorandum was submitted to the Committee by the Conjoint Conference of Public Utility Associations. This and the interim report were dealt with by a correspondent in the *Electrical Review* of March 6th last (p. 305). The Conjoint Conference emphasised the importance in the life of the nation of electricity, gas and water services and said that all matters such as the location of population, transport, housing, the siting of factories and the development of agriculture, which must come within the purview of a central planning authority must be of vital concern to public utility undertakings.

It maintained for these reasons that it was essential that each of the utilities should have representation on the central planning authority. Reference was also made to the necessity for defining " undeveloped land." The Conjoint Conference held that if a road had been made or sewered and mains and cables had already been laid under it, then it would be difficult to define that land or immediately adjacent land as " undeveloped," even if no buildings had been erected as the services would have enhanced the value of the land.

It was considered as essential that utility undertakings should retain control over land acquired for their purposes and also that a utility should be compensated if, as the result of planning, a substantial proportion of its consumers were removed from its area, thus rendering capital assets redundant and resulting in a loss of revenue.

The Uthwatt Committee's final report has now been published (Stationery Office, Cmd. 6386, 2s. 6d.). In it the Committee recommends that the rights of development in all land outside built-up areas shall be vested in the State on payment of fair compensation. This means a prohibition of development except with the consent of the State and compulsory acquisition where the land is required for public purposes or approved private development.

As regards developed land, it is recommended that legislation should be passed without delay providing that all areas not already covered by operative planning schemes or resolutions to plan should be deemed to be subject to such resolutions. Upon these bases the Committee makes detailed recommendations regarding compulsory purchase and assessment of compensation. A scheme for a periodic levy on a proportion of increases in annual site values, due to public improvements or a provision of planning schemes (" betterment "), as revealed by quinquennial assessments, is proposed.

In the course of the report the Committee says that it sees no reason why undeveloped land should, by reason of its ownership by a public utility, be excluded from the scheme for the acquisition of rights in undeveloped land. It would exclude from the scheme " land forming the site or the curtilage of any building used, or adapted or intended to be used, for the purposes of any trade, business or industry other than agriculture." Land not directly devoted to trade purposes (*e.g.*, a sports ground owned or leased by a commercial undertaking) should not be included in this exception.

Valuation of Undertakings

In dealing with the subject of the recovery of " betterment " the Committee says that property occupied by public utility undertakings, when used for the purpose of the undertakings, is included in the valuation list, but the annual value is arrived at on the profits basis. In the Committee's view it is unlikely that there would be any increase in the value of such property so long as it was used for the purposes of the undertaking, and it proposes that during that period it should be excluded from the operation of the scheme, but that an entry for annual site value of such property should be made in the valuation list as and when it ceases to be so used.

Dealing with the central planning authority the Committee says that however the authority is constituted and whatever departmental arrangements are made, it is essential that there should exist means by which the

requirements of agriculture, transport, public services and defence, as well as housing, industrial location, town siting and other matters can be given proper weight and consideration as a whole.

It is thought necessary that there should be a full-time chairman and a member of the economic staff of the Ministry of Works and Planning. It would be an advantage if no other members were full-time members. The opportunity should be seized of securing the services of persons who by their experience of public affairs, their knowledge of the needs of industry or of land utilisation would ensure commonsense administration and command the confidence of the public.

E.D.A. Activities

Fuel Economy. Large Cooking Installations.

MOST of the publicity matter issued by the British Electrical Development Association recently has been concerned with the Fuel Economy Campaign. During July, according to the August-September "E.D.A. Bulletin," four communications and budgets of publicity material were sent to members.

E.D.A. aids include more than twenty Press advertisements; a dozen simple window displays; a "campaign" for instructing consumers to read their meters; account slips; switch notices; cinema lantern slides; and notes for showroom staffs, demonstrators and others whose duties bring them into contact with the public. Meter reading forms for consumers devised by the County of London E.S. Co. and the Hornsey Electricity Department are made available by the consent of these two undertakings and E.D.A. offers to supply the necessary printing blocks.

An article in the Bulletin deals at some length with fuel economy in factories, setting forth many directions in which savings can be made. Emphasis is laid on the responsibility of electricity supply undertakings for advising their larger consumers on methods of reducing their maximum demand and consumption. Reference is made to the importance of appointing fuel economy officers or "waste chasers" in factories.

It is pointed out that a study of lighting installations may show many opportunities of reducing the number of lamps required and the importance of proper maintenance is stressed. Savings in power consumption and heating are touched upon and there are some notes on the prevention of waste in electric furnaces, particularly by having doors open for as short a time as possible.

Re-wiring Boiling Plates

At the July meeting of the supply members of the Electric Cooking Committee the view was expressed that in the re-wiring of boiling plates satisfactory results would be obtained by close adherence to the instructions given in Technical Service Data Sheet No. 1.

At a previous meeting of the Committee the manufacturers' representatives urged that in order to save labour and material a new design of open plate should be produced as a wartime measure. It would consist of a ceramic moulding grooved to take open wire spirals, similar to those produced for A.R.P. and other purposes, but of the standard 8-in. size with fixings and connections such as to make it interchangeable with existing solid plates. It was considered that the latest nichrome wire and ceramic material used in a well-drained moulding should ensure reasonable life, provided there were not continued misuse.

It was agreed that as the manufacturers were willing to incur jointly the cost of the necessary tools some sample plates should be made and tested in ordinary domestic use. These samples will be available shortly.

General approval was given to Technical Service Data Sheet No. 2, dealing with the re-winding of Bulpitt kettle elements by a process originally developed by the Brighton undertaking. The method has been adopted by one or two other authorities and is recommended to others who have workshop space and labour available as well as facilities for making the necessary special tools.

The Committee has decided to form a Technical Sub-Committee, comprising engineers of member undertakings with expert knowledge of cooker design and repair. The Sub-Committee will consider in detail and report on proposals already made in broad outline for the interchangeability of the replacement parts of electric cookers.

Large-scale Cooking

Heavy-duty cooking equipment in Canteens and British Restaurants was discussed at a meeting of the N.W. England and North Wales Area Senior Staffs when Mr. P. Honey, who was the first speaker, said that in the past two years about 100,000 kW of commercial cooking equipment had been installed throughout the country. There were many instances of 300 to 500 kW installations and in some the total loading ran into four figures.

He mentioned the literature made available by the Association on this subject, including that in the E.D.A. Staff Information and Data Handbook, and foreshadowed the issue of a further instalment of the new series of Technical Data Sheets covering the whole subject of commercial cooking.

Mr. Burton (Liverpool), dealing with the question of steam supplies for cooking in British Restaurants, claimed considerable success for electrode boilers largely on account of their rapid starting from cold and their economy at all loads. Liverpool's latest British Restaurant was all-electric, the consumption being about 82,000 kWh per annum. It catered for over 1,000 persons per day and the average consumption was 0·25 kWh per meal. In larger restaurants, preparing about 12,000 meals per day, the average was as low as 0·1 kWh per meal.

Mr. Cameron Kirby, who lent his showrooms for the purpose of the conference, gave detailed figures of consumption in a British Restaurant at Wilmslow.

Contract Prices

Adjustment Formulæ for Varying Costs

WHEN war broke out the Council of the British Electrical and Allied Manufacturers' Association recommended Association members to adopt the B.E.A.M.A. price-variation clause in wartime contracts. Subsequently a number of price adjustment clauses for use with the Standard Conditions of Contract were drafted and formulæ were prepared to establish a basis for the application of the clauses.

In October, 1941, as the Incorporated Municipal Electrical Association felt that these formulæ required modification to make their application more equitable, the matter was taken in hand by the I.M.E.A./B.E.A.M.A. Joint Committee. New clauses and formulæ were prepared and they have now been approved by both Associations as suitable for use in contracts covered by the I.E.E. Model Forms of General Conditions or by the standard B.E.A.M.A. conditions of sale.

The new main clauses, as before, distinguish between contracts excluding and including the erection of plant and refer specifically to costs of material, labour, transport and "of conforming to statutory obligations." Alternative clauses detail the latter to some extent, referring to the cost of meeting the requirements of by-laws, etc., of local or other authorities. They also exclude from the scope of the clauses any extra costs incurred by the contractor through his own default or negligence.

Labour and Materials

The formulæ for calculating variations in respect of contracts excluding erection are as follows :—

(*a*) For any variation in the rates of pay of adult male labour accepted nationally by the Engineering and Allied Employers' National Federation ruling at the date of tender the price quoted shall be adjusted at the rate of 0.4 per cent. of the price quoted per 1.0 per cent. variation multiplied by the fraction of the total time from the date of the order to the date when ready for despatch which had not expired at the date of such variation.

(*b*) For any variations in the cost of materials employed in completing the order ruling at the date of tender, the price quoted shall be adjusted at the rate of 0.45 per cent. of the price quoted for each 1.0 per cent. by which the index figure for intermediate products, last published in the *Board of Trade Journal* before the date which is one-third way between the date of order and the date when ready for despatch, is above or below the index figure last published before the date of tender.

The term " rates of pay " is to be deemed to include basic wage rates, bonuses, allowances and other forms of remuneration and the rate of pay for adult male labour is to be deemed to have been 67s. per week at September, 1939.

Similar adjustments are provided for in the case of contracts up to and including £50,000, including erection, except that in (*a*) the period taken is the fraction of the total time between the date of order to the date when the plant is ready for commercial use or taking over, whichever is the earlier. The plant is to be deemed ready for commercial use even though certain minor matters which do not affect the use for which the plant is intended remain to be completed.

As regards contracts over £50,000, including erection, the formula for alterations in labour costs is the same as (*a*) above but (*b*) is varied by the substitution of one-half way for one-third way as the period between the date of order and date when ready for despatch.

Rates of Pay

In some explanatory notes it is stated that B.E.A.M.A. has agreed that no claim will be made by its members if the total variation calculated in accordance with the appropriate formula is less than £10 or 1 per cent. of the contract price, whichever is the greater.

It is noted that the 67s. per week referred to as the rate of pay for adult male labour at September, 1939, is made up of a basic rate of 45s. plus the national bonus of 20s. applicable to all adult male labour at that date, plus the special time-workers' bonus of 2s. The basic rates vary according to the type of worker and/or the district and the figure of 45s. was taken as being representative.

Since September, 1939, there have been three awards, *viz.*, 5s. a week from February 19th, 1940; 3s. 6d. a week from January 20th, 1941; and 5s. a week from December 10th, 1941. The rate of pay ruling at August 1st, 1942, was thus 80s. 6d.

The monthly figures of the Board of Trade Index for Intermediate Products show a rise from 104·0 (basis 1930=100) in August, 1939, to 169·2 in July, 1942.

The operation of the formulæ is limited to changes in wages and costs of materials. The figures agreed as representing the proportion of the contract price affected by such changes are the result of a careful analysis of actual results. The B.E.A.M.A. has given an assurance to the I.M.E.A. that it will be willing to re-open negotiations if experience shows that any change is desirable.

ELECTRICITY SUPPLY

Concessions at Oswestry. Plymouth's Position.

Accrington.—SATISFACTORY YEAR'S WORKING.—Sir Thomas Higham, chairman of the Electricity Committee, informed the Town Council on September 8th that the undertaking had had another satisfactory year, despite war conditions. They were now improving and reconditioning much of their plant and were doing their best to fit it for service in the immediate future.

Carlisle.—NEED TO REDUCE DEMAND.—Presenting the report of the Electricity Committee at a recent meeting of the City Council, Councillor J. R. Potts, chairman, said that unless something was done voluntarily to reduce the demand, compulsory steps would have to be taken. He suggested that electrical contractors could help by not doing anything to increase the load on the electricity undertaking. Councillor Potts stated that many people were using electric cookers in order to save coal.

Gainsborough.—JOINT METER READING.—A scheme for combined readings of gas and electricity meters in houses where both services are provided has been approved by the Urban District Council.

Grantham. — DISCONTINUANCE OF "STARLIGHTING."—It is reported that the system of low-intensity street lighting is to be discontinued, chiefly on the ground of economy, but also because it is felt that the small amount of light provided is of comparatively little help to the public.

London.—POPLAR.—The Electricity Committee recommends that where application is made by consumers for a reduction in fixed charges on the special shop lighting and heating tariff on the ground of war conditions, the applicants shall revert to the flat rate charge of 4½d. per kWh plus the war increase.

The borough electrical engineer has been authorised to proceed with the change-over in the Teviot Street area at an estimated cost of £1,020.

Oswestry.—CHEAPER ELECTRICITY.—A number of concessions have been introduced in the schedule of charges of the Corporation Electricity Department, of which Mr. H. Breckell, A.M.I.E.E., is engineer and manager. The changes take effect as from the beginning of the September quarter and follow consideration of the financial results of the past year's working. The reductions are made in the charges which were actually in force before the outbreak of war, no increases having been imposed during the war period. Under the domestic tariff the "unit" charge of 1d. has been reduced to ¾d., the fixed charge remaining at 5 per cent. of the rateable value for the quarter. Under the lighting flat rate (6½d. per kWh up to 1,000 kWh per quarter and 6d. thereafter up to 11,000 kWh) the rebate has been raised from 5 to 7½ per cent.; consumption over 11,000 kWh continues to be charged at 3d. per kWh net. In the case of the prepayment lighting rate (8d. per kWh) there is a similar increase in rebate, and also on the charge of 6s. 6d. per lamp per quarter under the alternative business rate (4d. per kWh net is charged for all kWh above 12 per lamp per quarter on this rate). Minimum charges have been reduced from 8s. 4d. to 5s. (summer) and from 12s. 6d. to 7s. 6d. (winter).

Plymouth.—DEBATE ON UNDERTAKING'S FINANCES.—When the minutes of the Electricity Committee which, as reported last week, contained a proposal for a further increase in charges, were presented to the City Council there was considerable discussion on the financial position of the undertaking. Councillor F. Leatherby gave details of the losses sustained and of an interview with the Electricity Commissioners on the subject. An increase of 33⅓ per cent. on pre-war charges was necessary, he said, to meet the higher cost of coal (the present price was 45s. 6d. a ton compared with 18s. 6d. in 1935) and the reduction in revenue through a very large number of consumers being lost to the undertaking. The Commissioners considered that some increase would have been necessary even if the intensive air-raids had not occurred, in view of the increased cost of coal, and they therefore recommended that a further addition of 10 per cent. should be made to the charges, making a total of 20 per cent. on pre-war rates. They stated that any further increase in excess of that amount would not be favoured.

Moving the reference back of the minute to the Finance Committee, Alderman L. R. Dunstan said that he did not see why the reserve fund should be depleted in a "blitzed" city, while places which had escaped were allowed to get off scot free. This view was supported by Alderman J. Churchward, who contended that as power was given and taken on the grid system there should be an equal sharing of the burden. He also objected to people who stayed in Plymouth having to pay increased charges, whereas those who left would not. In reply to this Councillor Leatherby pointed out that in any case an increase in the price of electricity would have been necessary.

Councillor G. P. Holmes moved an amendment that the Finance and Establishment Committee should be instructed to investigate how best the financial position of all the Corporation trading undertakings could be safeguarded and to take steps to secure from the Government substantial financial assistance to meet the losses sustained owing to enemy action. This was carried by 25 votes to 19.

Salford.—PROPOSED POWER TARIFF INCREASE.—The Light, Heat and Power Committee is seeking the consent of the Electricity Commissioners to an increase in the running charge under the two-part tariff for large power users. Instead of the graded tariff of 0·3d. to 0·4d. per kWh it is proposed that the figure should be 0·4d. per kWh for all consumption.

Scarborough.—SUPPLY ARRANGEMENT.—At the request of the Buckrose Light & Power Co., Ltd., the Corporation Electricity Committee has agreed to supply premises outside its area of supply and within the company's area.

Stalybridge.—GRANTS TO CONSTITUENT COUNCILS.—The Stalybridge, Hyde, Mossley and Dukinfield Joint Transport and Electricity Board has received a letter from the four constituent corporations thanking the Board for the recent grants of £4,000 each in aid of the rates. At Mossley it was stated that the contribution was equal to about a 2s. rate.

GLOSSOP INDUSTRIAL SUPPLIES.—The Board has decided that the Glossop two-part industrial tariff shall be subject to the same conditions as scale F now applicable to other parts of the Board's area of supply.

Swindon.—LOAN SANCTIONED.—The Electricity Committee has obtained sanction to borrow £4,828 for switchgear.

Watford.—SUPPLY TO PARK.—The Electricity Committee is to provide supply to Cassiobury Park at a cost of £200, in connection with the holidays at home scheme.

Overseas

Canada.—POWER FOR PAPER MILLS.—No move will be made to curtail or otherwise control electrical power available to Canadian pulp and paper industries for at least a month or six weeks, it is reported. This information was forthcoming after a delegation had protested against any proposed policy of power diversion without full investigation and urging that power to luxury industries should be restricted first. Mr. Elliott M. Little, Director of National Selective Service, stated that an advisory committee had been formed to study the dislocation which might result if supplies to the paper mills were restricted.

Germany.—ECONOMY APPEAL.—It is reported that Field Marshal Goering has issued an appeal to housewives to economise in the use of electricity and gas in order to reduce coal consumption.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

A. C. Cossor, Ltd., report a profit for the year to March 31st of £66,676, after providing for income tax. The final ordinary dividend is 5 per cent., free of tax, which with the interim of 5 per cent., less tax, makes the equivalent of 7½ per cent., free of tax, or 15 per cent., less tax, for the year (unchanged). The balance carried forward is raised by £14,176 to £44,135. The net profit for 1940-41 was £94,701, out of which £30,000 was placed to taxation reserve.

A statement by the chairman shows that the two principal subsidiaries, Sterling Cables, Ltd., and Sterling Batteries, Ltd., are operating very satisfactorily. Since the date of the balance sheet the cable company has acquired over 90 per cent. of the share capital of Lancashire Cables, Ltd., which, it is stated, will enable it to extend its production in the high-voltage field.

Telephone Rentals, Ltd.—At the company's annual meeting held in London this week, Mr. F. T. Jackson, chairman and joint managing director, said that the small decrease in gross dividends from subsidiary companies (£133,820 against £136,268 in the previous year) arose in part from increased costs of maintenance, together with expenditure on insurance against war damage, which was very considerable. These increased costs had been partly offset by a percentage increase in annual rental charges. The accounts indicated that the company was making progress even though trading conditions were difficult; all the apparatus they had developed was in great demand. Provided the materials and labour position did not worsen he saw no reason to anticipate any falling off in the financial results during the current year.

Richard Johnson, Clapham and Morris, Ltd., are paying a final ordinary dividend of 11¼ per cent., making 15 per cent. for the year (same). The 6 per cent. non-cumulative participating preference shares again receive an extra 1 per cent., making 7 per cent. for the year.

The Perak River Hydro-Electric Co., Ltd.,—The directors announce that no further dividend will be paid on the 5 per cent. preference shares until the company's properties are restored.

The Hoffmann Manufacturing Co., Ltd., has again declared an interim dividend of 7½ per cent., free of tax.

The Midland Electric Corporation for Power Distribution, Ltd., is again paying an interim dividend of 3 per cent.

A. Reyrolle & Co., Ltd.—The company's interim ordinary dividend is 5 per cent., as last year.

The Western Union Telegraph Co., is paying a quarterly dividend of 50 cents per share (same).

The Automatic Telephone & Electric Co., Ltd., is maintaining its interim dividend at 3 per cent.

British Insulated Cables, Ltd., announce an interim dividend of 5 per cent., the same as last year.

Enfield Cable Works, Ltd., is again paying an interim dividend of 6¼ per cent.

The Electric Supply Corporation, Ltd., has declared an interim dividend of 3¼ per cent. (same).

The Lancashire United Transport and Power Co., Ltd., is repeating its interim dividend of 4 per cent.

The West London & Provincial Electric & General Trust, Ltd., is repeating its interim dividend of 2 per cent.

The Watford Electric & Manufacturing Co., Ltd., is again paying an interim dividend of 5 per cent.

Whitehall Electric Investments, Ltd., is paying a dividend of 2½ per cent. on the 7½ per cent. cumulative preference stock, in respect of the half-year ended March 31st, 1942.

Pye, Ltd., announces a first and final dividend of 25 per cent. on the deferred stock, the same as last year.

British Ropes, Ltd., have declared an interim dividend of 5 per cent. (same).

New Companies

Helikon, Ltd.—Private company. Registered August 29th. Capital, £100. Objects: To carry on the business of merchants, importers, exporters and manufacturers of, and dealers in, electrical, medical, scientific and radio apparatus, components and devices, wireless valves, television and cinematograph apparatus, etc. Subscribers: A. Wheatley, 42, Farm Avenue, N.W.2, and J. Thomas, 1, James Street, Enfield. Secretary: J. Thomas. Registered offices: 232-8, Bishopsgate, London, E.C.2.

Thermax Elements, Ltd.—Private company. Registered September 5th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical resistance wires and tapes, mica or other refractory materials, elements and electrical appliances, etc. Directors: A. C. Scott and Beatrice Scott, both of Manor House, North Rode, Cheshire (both directors of A. C. Scott & Co. Ltd. and Geoffrey Scott, Ltd.) Solicitor: H. F. Langstaff, Macclesfield. Registered office: Cromaley House, City Road, Manchester 15.

V. & E. Plastics, Ltd.—Private company. Registered September 4th. Capital, £1,200. Objects: To carry on the business of manufacturers of plastic goods and compounds, etc. Permanent directors: M. Berg, 132, Viceroy Close, Bristol Road, Birmingham, and S. Friedland, The Hostel, Bollington, nr. Macclesfield. Solicitor: James Ore, 33, Temple Row, Birmingham.

Companies' Returns

Statements of Capital

A. Reyrolle & Co., Ltd.—Capital, £1,250,000 in £115,000 preference stock, £816,711 ordinary stock and 318,289 unclassified shares of £1. Return dated April 30th. £102,500 preference and £816,711 ordinary stock taken up. £875,500 paid on 102,500 preference and 773,000 ordinary shares. £43,711 considered as paid on 43,711 ordinary shares. Mortgages and charges: Nil.

Ericsson Telephones, Ltd.—Capital, £700,000 in 199,970 preference shares of £1 and 499,970 ordinary shares and 1,500,150 ordinary stock units of 5s. Return dated April 16th. All preference and ordinary stock units issued and fully paid up. Mortgages and charges: £50,000.

British Resistor Co., Ltd.—Capital, £16,000 in 15,000 6 per cent. preference shares of £1 and 20,000 ordinary shares of 1s. each. Return dated May 19th. 3,000 preference and 2,222 ordinary shares taken up. £3,111 2s. paid. Mortgages and charges: Nil.

West Hampshire Electricity Co., Ltd.—Capital, £250,000 in £1 shares. Return dated March 31st (filed May 7th). All shares taken up. £250,000 paid. Mortgages and charges : Nil.

Dunoon & District Electricity Supply Co., Ltd.—Capital, £200,000 in £1 shares. Return dated May 14th. 160,000 shares taken up. £160,000 paid. Mortgages and charges: Nil.

F. R. Skeels (Electrical Engineers), Ltd.—Capital, £500 in £1 shares. Return dated May 18th. 320 shares taken up. £320 paid. Mortgages and charges: Nil.

Western Telegraph Co., Ltd.—Capital, £3,500,000 in £3,118,950 ordinary stock and 38,105 shares of £10. Return dated July 9th. All stock taken up. £2,339,650 paid. £779,300 considered as paid. Mortgages and charges: £818,675.

British Electric Meters, Ltd.—Capital, £50,000 in £1 shares. Return dated July 14th. 35,600 shares taken up. £28,250 paid. £7,350 considered as paid. Mortgages and charges: Nil.

West Insulating Co., Ltd.—Capital, £1,500 in 15 shares of £100 each. Return dated June 5th. 10 shares taken up. £1,000 paid. Mortgages and charges : Nil.

Funditor, Ltd.—Capital, £5,000 in £1 shares. Return dated May 1st. All shares taken up. £5,000 paid. Mortgages and charges : Nil.

Increases of Capital

Tadcaster Electricity Co., Ltd.—The nominal capital has been increased by the addition of £29,000 in £1 ordinary shares beyond the registered capital of £21,000.

Powell & Lee, Ltd.—The nominal capital has been increased by the addition of £4,500 in £1 ordinary shares beyond the registered capital of £500.

Mortgages and Charges

Linolite, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated August 21st, 1942, to secure all moneys due or to become due from the company to Westminster Bank, Ltd.

F. H. Bastin & Son, Ltd.—Particulars filed of £3,000 debentures, authorised August 22nd, 1942, charged on the company's undertakings and property, present and future, including uncalled capital, the whole amount being now issued.

Sturtevant Engineering Co., Ltd.—Satisfaction in full on August 7th, 1942, of charge dated February 14th, 1911, and registered February 28th, 1911.

Liquidations

Ilkley Wireless Service Co., Ltd.—Meetings, October 15th at 32–34, Cookridge Street, Leeds, to receive an account of the winding-up by the liquidator, Mr. J. H. Turnbull.

Bankruptcies

H. Rose, electrical contractor and dealer, 158, Soho Road, Handsworth, Birmingham (Rose Electrical Service).—First and final dividend of 2s. 7½d. in the £, payable September 28th, at 72, Middleton Hall Road, Kings Norton, Birmingham, 30.

T. P. Wood and **T. George,** trading in partnership as T. P. Wood, electrical contractors, at 28, Queen Street, Ipswich.—Last day for receiving proofs for dividend September 29th. Trustee, Mr. E. K. Fisk, 13a, Great Colman Street, Ipswich.

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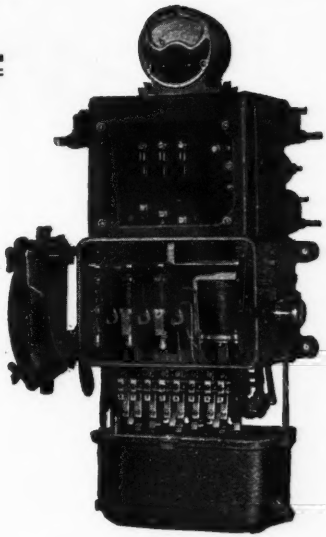
Up to 50 H.P., 400/440 VOLTS



Oil Immersed Star-Delta Starter

VERITYS LTD.

ASTON, BIRMINGHAM 6

Sales Headquarters :
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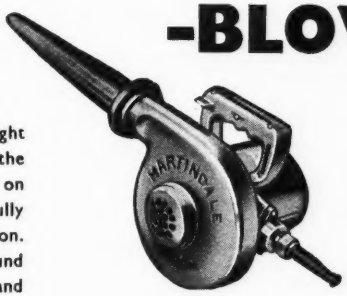
"SUPER -BLOWERS"



The most efficient lightweight portable blowers ever put on the market. Precision-built, on interchangeable lines, carefully balanced to eliminate vibration. Armatures and coils hand-wound and impregnated to withstand all conditions of service all over the world.

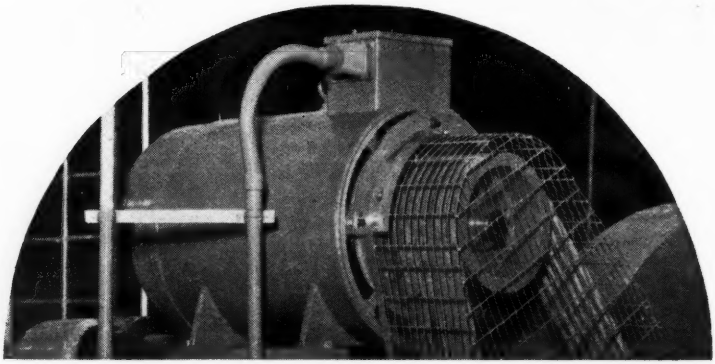
Write for literature.

Three models (1) "Mill-type" (2) Standard (3) "Blower-Clean"

All models can be instantly converted into powerful industrial vacuum cleaners.

MARTINDALE ELECTRIC CO. LTD., Westmorland Road, LONDON, N.W.9

Telephone : Colindale 8642-3 *Telegrams : Commstones, Hyde, London*



THE L.S.E. LOW CURRENT HIGH TORQUE MOTOR **is better and cheaper than a slip-ring motor for most jobs because:**

It has **no slip-rings or brushes** and consequently **no brush-lifting or short-circuiting gear.**

It has a **high starting torque** and **low starting current,** and a **high accelerating torque** maintained throughout the accelerating period.

It has **efficiencies equal to the corresponding slip-ring motor.**

It has no wearing parts other than the bearings and maintenance costs are very low.

The L.S.E. Low Current High Torque motor is made in all standard enclosures, including "EMCOL," in sizes up to 750 HP.

LAURENCE, SCOTT & ELECTROMOTORS LTD.

NORWICH, MANCHESTER LSE LONDON & BRANCHES

STOCKS AND SHARES

TUESDAY EVENING.

STOCK EXCHANGE markets continue to attract a fair amount of business and, having regard to all the circumstances of the time, prices in most departments keep very firm. British Government securities maintain their high ground, and this is a consideration which influences investment stocks and shares in many other departments. Money flows steadily into the markets. Without there being any outstanding feature, it may be said that the tendency at the present time is for prices steadily to improve, especially when any pressure to obtain the stock is applied.

New Central Board Stock

The placing of £2,000,000 Central Electricity (Civil Defence) 3 per cent. 1955–1960 stock in private hands at 97½ without the transaction coming through the Stock Exchange market aroused no little discussion and a certain amount of criticism. The whole amount was placed in the hands of a few monied institutions, of which the Prudential was named as being one, and none of the stock came into the Stock Exchange market. An issue of this nature would ordinarily have been either offered for public subscription, or would have been placed in blocks of varying amounts with City houses, including of course, some Stock Exchange firms. In defence of the new departure, it is urged that private placing serves to reduce expense in the shape of labour, time, stationery and money. The Stock Exchange Committee has given permission for dealing to take place in the stock, and it is changing hands on the basis of 98¼. The minimum price has been fixed at 96.

Home Rails Revive

By one of those sudden twists of popular financial fancy for which it is difficult to account, Home Railway stocks have returned to public favour. Possibilities of post-war nationalisation of the railways, present-day demands for higher wages, and the future uncertainties surrounding the Government's bargain with the companies have kept people away from the market. All at once, however, buyers have come along with substantial sums that they wish to invest in the popular stocks, amongst the latter being some which stand no chance of receiving a dividend for years to come. Southern Railway issues have participated in the present popularity of the market, the preferred stock being 1½ up at 68. Transport "C" retains its advance to 48.

Holders of London Passenger Transport "C" stock may consider themselves rather hardly used, in that a few months before the outbreak of war, the stock came within view of the possibility of earning 5½ per cent. dividend. The expansion of traffic was such as to suggest that, with consistent increases of this nature, Transport "C" could fairly be expected to get at least a 5 per cent. dividend. War broke out, and the Board became merged in the Railway Pool with the four main-line railway companies. The effect of this has been to reduce the proportion due to the Board to an amount which allows barely 3 per cent. dividend on the stock and it would seem that this is about as much as can be expected during the war and for one year afterwards.

Price Fluctuations

Amongst home electricity supply shares, Newcastle Electrics moved up to 30s. on a little inquiry from local sources. The only change amongst London shares is a decline of 9d., to 18s. 9d. in London Associated Electric. Victoria Falls ordinary at 75s. shows a rise of $\frac{1}{16}$ on the issue of the latest report ; at this price, the return on the money comes to no more than 4 per cent., but the shares are firmly held. West Riding Transport have strengthened to 39s. and Bristol Trams to 46s. 3d. In the communications group, Cable and Wireless ordinary stock at 62 has gained a point. Anglo-American Telegraphs are a shade easier.

Equipment and Manufacturing

Telephone shares are in continuing demand. Telephone Properties have strengthened to 12s., and in the Home group, Telephone Rentals are better at 9s. 6d. A lively speculation in some of the radio manufacturing companies' shares has been in progress. A.C. Cossor shares fluctuated between 12s. 6d. and 11s. 6d. upon the issue of the report and dividend declaration. After dipping to the lower figure, they rallied to 12s. Pye deferred hold their rise at 18s. 3d. Electric and Musical Industries have been changing hands in substantial quantities on the basis of 17s. 6d. Telephone Manufacturing strengthened to 10s. Hall Telephones at 20s. 9d. are 6d. better.

Tube Investments hardened to 87s., Westinghouse Brake to 50s., Callender's to 73s. 9d. and Ever Ready shares to 33s. 3d. Beyond these changes, the equipment and manufacturing group shows no particular alteration. British Vacuum Cleaner eased off to 16s. 6d. and Vactrics, after their abrupt rise, fell 3d. to 8s. 6d. Among shares in the heavy industries, Babcock & Wilcox at 46s. 6d. and Vickers at 17s. 3d. are a few pence harder.

Enfield Cable

It was observed last week that the average income to be obtained from investment in

(*Continued on page* 381)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Sept. 15	Rise or Fall	Yield £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	50/–	..	5 0 0
British Power and Light	6	6	26/–	..	4 12 4
City of London	7	7	26/3	..	5 6 8
Clyde Valley	8	8	40/–	..	4 0 0
County of London	8	8	35/–	..	4 11 6
Edmundson's:					
7% Pref.	7	7	33/9	..	4 3 0
Ord.	6	6	28/–	..	4 5 9
Elec. Dis. Yorkshire	9	9	42/–	..	4 5 9
Elec. Fin. and Securities	12½	12½	48/9	..	5 2 6
Elec. Supply Corporation	10	10	45/–	..	4 9 0
Isle of Thanet	2	Nil	11/3	..	—
Lancs. Light and Power	7½	7½	33/–	..	4 11 0
Llanelly Elec.	5½	5½	22/6	..	4 17 9
Lond. Assoc. Electric	4½	4	18/9	..	4 2 1
London Electric	6	6	23/9	..	—
London Power Red. Deb.	5	5	104½	..	4 15 7
Metropolitan E.S.	8	8	35/–	..	4 11 6
Midland Counties	8	8	38/9	..	4 2 6
Mid. Elec. Power	9	9	42/–	..	4 5 9
Newcastle Elec.	7	7	30/–	+ ¼	4 13 5
North Eastern Elec. Ordinary	7	7	31/3	..	4 9 7
7% Pref.	7	7	33/6	..	4 3 7
Northampton	10	10	46/3	..	4 6 6
Notting Hill 6% Pref. (£10)	6	6	9	..	—
Northmet Power:					
Ordinary	7	7	32/6	..	4 6 2
6% Pref.	6	6	30/6	..	3 18 8
Richmond Elec.	6	6	25/–	..	—
Scottish Power	8	8	38/3	..	4 3 9
Southern Areas	5	5	20/–	..	5 0 0
South London	7	7	25/–	..	—
West Devon	5	5	22/6	..	4 9 0
West Glos.	4½	3½	20/–	..	3 10 0
Yorkshire Elec.	8	8	40/–	..	4 0 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	4/6	+3d.	—
Calcutta Elec.	7*	7*	25/9	+9d.	5 8 9
Cawnpore Elec.	10	10	25/–	..	8 0 0
East African Power	7	7	27/–	..	5 3 8
Jerusalem Elec.	7	5	17/6	..	5 14 4
Kalgoorlie (10/-)	7½	5	7/6	..	6 13 4
Madras Elec.	6*	4*	18/9	..	4 5 4
Montreal Power	1½	1½	24	..	6 5 0
Palestine Elec. "A"	Nil	4*	21/3	..	3 15 3
Perak Hydro-elec.	6	7	7/6	..	—
Shawinigan Power	83cts.	90cts.	15½	..	—
Tokyo Elec. 6%	6	6	13½	..	—
Victoria Falls Power	15	15	75/–	+ ½	4 0 0
Whitehall Inv. Pref.	5	5	15/9	..	6 7 0

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Sept. 15	Rise or Fall	Yield £ s. d.
Public Boards					
Central Electricity:					
1950–70	5	5	109	..	4 11 9
1955–75	5	5	114	..	4 7 9
1951–73	4½	4½	107½	..	4 3 9
1963–93	3½	3½	103½	..	3 7 8
1974–94	3½	3½	99½	..	3 5 4
London Elec. Trans. Ltd.	2½	2½	96	..	2 12 1
London & Home Counties 1955-75	4½	4½	109	..	4 2 7
Lond. Pass. Trans.:					
A	4½	4½	115½	..	3 18 0
B	5	5	114½	..	4 7 4
C	3	2⅞	48	..	5 19 10
West Midlands J.E.A. 1948–68	5	5	108xd	..	4 12 7
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	110	– ½	5 9 1
Def.	1½	1½	26	..	5 15 5
Anglo-Portuguese	8	8	18/6	+3d.	8 13 0
Cable & Wireless:					
5½ Pref.	5½	5½	103½	..	5 6 3
Ord.	4	4	62	+1	6 9 2
Canadian Marconi $1	Nil	4cts.	5/–	..	3 7 0
Globe Tel. & Tel.:					
Ord.	8½*	5*	27/6	..	3 12 9
Pref.	6	6	27/6	..	4 7 5
Great Northern Tel.:					
(£10)	Nil	Nil	16	..	—
Inter. Tel. & Tel.	Nil	Nil	3	..	—
Marconi-Marine	7½	7½	29/–	..	5 3 5
Oriental Tel. Ord.	16	10	52/6	..	3 16 2
Telephone Props.	6	Nil	12/–	+9d.	—
Tele. Rentals (5/–)	10	10	9/6	+3d.	5 5 3
Traction and Transport					
Anglo Arg. Trans.:					
First Pref. (£5)	Nil	Nil	3/–	..	—
4% Inc.	Nil	Nil	9½	+1	—
Brit. Elec. Traction:					
Def. Ord.	45	45	950	..	4 14 8
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8	10	46/3	+ ½	4 6 6
Brazil Traction	$1	50c	16½	..	—
Calcutta Trams	8	5½	18/3	..	6 0 9
Cape Elec. Trams	5	5	21/–	..	4 15 3
Lancs Transport	10	10	43/9	..	4 11 4
Mexican Light:					
1st Bonds	5	5	90	..	5 11 1
Rio 5% Bonds	5	5	101	..	4 19 0
Southern Rly.:					
5% Prefd.	5	5	68	+1½	7 7 1
5% Pref.	5	5	105½	..	4 14 9
T. Tilling	10	10	47/–	..	4 5 3
Tilling & B.A.	7*	6½*	57/6	..	2 5 3
West Riding	10	10	39/–	+6d.	5 2 7

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Sept. 15	Rise or Fall	Yield p.c.
Equipment and Manufacturing					£ s. d.
Aron Elec. Ord. ..	Nil	7½	26/–	..	5 15 5
Assoc. Elec. :					
Ord.	10	10	46/3	..	4 6 6
Pref.	8	8	39/–	..	4 2 0
Automatic Tel.&El.	12½	12½	52/6	..	4 15 3
Babcock & Wilcox	11	11	46/6	+6d.	4 15 8
British Aluminium	10	10	45/–	..	4 9 0
British Insul. Ord.	20	20	95/–	..	4 4 3
British Thermostat (5/–)	18½	18½	16/3	..	5 13 10
British Vac. Cleaner (5/–)	12½	10	16/6	–6d.	—
Brish Ord. (5/–)..	Nil	6	6/6	..	4 12 4
Callender's ..	15	15	73/9	+ 1/6	4 1 4
ChlorideElec.Storage	15	15	72/6	..	4 2 9
Cole, E. K. (5/–)..	Nil	7	14/–	..	2 10 0
Consolidated Signal	17	17	70/–	..	4 17 2
Crabtree (10/–) ..	17½	17½	32/6	..	5 7 8
Crompton Parkinson Ord. (5/–) ..	30	20	21/3	..	4 14 0
E.M.I. (10/–) ..	Nil	6	17/6	..	3 8 7
Electric Construction	10	10	31/6	..	5 16 0
Enfield Cable Ord.	12½	12½	52/6	..	4 15 3
Elecl. Switchgear (10/–)	10	10	20/–	..	5 0 0
English Electric ..	10	10	41/3	..	4 17 0
Ensign Lamps (5/–)	25	25	16/3	..	7 13 10
Ericsson Tel. (5/–)	22°	20°	41/3	..	2 8 6
Ever Ready (5/–)	40	40	33/3	+3d.	6 0 6
Falk Stadelmann	7½	7½	23/9	..	6 6 4
Ferranti Pref. ..	7	7	27/6	..	5 1 10
G.E.C. :					
Pref.	6½	6½	33/9	..	3 17 0
Ord.	20	17½	80/–	..	4 7 6
Greenwood & Batley	15	15	32/–	..	9 7 6
Hall Telephone(10/–)	10	12½	20/9	+6d.	6 0 5
Henley's (5/–) ..	20	20	22/6	..	4 9 1
4½% Pref. ..	4½	4½	23/–	..	3 18 3
Hopkinsons ..	15	15	52/6	+6d.	5 14 5
India Rubber Pref.	5½	5½	20/–	..	5 10 0
Intl. Combustion..	32½	30	107/6	..	5 12 0
Johnson & Phillips	15	15	60/–	..	5 0 0
Lancashire Dynamo	20	20	71/3xd.	..	5 12 4
Laurence, Scott(5/–)	15	12½	9/6	..	6 11 7
London Elec. Wire	7½	7½	28/3	..	5 6 2
Lucas, J.	15	15	68/9	+ ¼	4 7 3
Mather & Platt ..	10	10	40/–	..	5 0 0
Met.Elec.Cable Pref.	5½	5½	21/3	..	5 3 6
Murex	20	20	97/6	..	4 2 0
Pye Deferred (5/–)	25	25	18/3	..	6 17 0
Revo (10/–) ..	20	17½	30/–	..	5 16 8
Reyrolle	12½	12½	60/6	..	4 2 0
Siemens Ord. ..	7½	7½	26/3	..	5 14 3
Smith, S. (1/–) ..	50	37½	8/3	..	4 11 0
Strand Elec. (5/–)	2	4	4/6	..	4 9 0
Switchgear & Cowans (5/–) ..	15	10	10/–	..	5 0 0
T.C.C. (10/–) ..	5	5	15/–	..	3 6 8
T.C. & M... ..	10	10	43/9	..	4 11 4
Telephone Mfg.(5/–)	9	9	10/–	+3d.	4 10 0
Thorn Elec. (5/–)..	20	20	16/3	..	6 3 1
Tube Investments	23¾	20	87/6	+1/–	4 12 0
Vactric (5/–) ..	Nil	Nil	8/6	–3d.	—
Vickers (10/–) ..	10	10	17/3	+3d.	5 16 0
Ward & Goldstone (5/–)	20	20	20/–	..	5 0 0
Westinghouse Brake	10	10	50/–	+ ½	4 0 0
Walsall Conduits(4/–)	55	55	38/9	..	5 13 4
West, Allen (5/–)	7½	7½	5/9	..	6 10 5

° Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 379)

the first-rank ordinary shares of cable and equipment companies is barely 4½ per cent. on the money. Callender's at 73s. 9d. give £4 1s. 4d., British Insulated at 95s. pay £4 4s. per cent. and Henley's at 22s. 6d. return £4 9s. per cent. Moreover, these yields are calculated at the middle prices, and it is by no means certain—in fact it is very unlikely—that shares could be obtained at these figures. Callender's, for instance, are not openly offered under 75s. at which price the return is £4 per cent. and British Insulated for which the market is asking 96s. pay £4 3s. 4d. at that price. Within the last week or two, a line of Enfield Cable shares came on sale : very quickly some 12,000 shares were placed on the basis of 52s. At the time of writing, there are still 5,000 shares on offer and these could probably be obtained at 53s., giving a return of £4 3s. 4d. per cent. which, by comparison, is tolerably good.

The Enfield Cable Company reduced its dividend from 16¼ per cent. in 1939, to 12½ per cent. in each of the two succeeding years, but it is reasonable to expect that the latter will be maintained. An interim dividend of 6¼ per cent. was announced last week.

Para Electric

The Para Electric Railway and Lighting Co. of Brazil has sadly disappointed holders of its 6 per cent. debenture stock which was expected to return to the dividend list in the autumn of this year. By an agreement of 1936, payment of interest on the 6 per cent. stock was suspended until this year. Owing to the entry of Brazil into the war, and the increased credit which this has brought to Brazilian securities as a whole, it had been thought that the Para Electric sixes would receive at any rate 3 per cent. before the end of 1942. But the company has issued a circular proposing that payment of interest shall be postponed until 1946. The price of the bonds, which had been up to 38 two or three months ago, fell to 26 and the market in them has become more or less nominal. It would not be surprising if, when the effect of this shock has worn off, the price of the bonds were to show a moderate recovery, having regard to the expansion of Brazilian trade and industry.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specifications (1*s. each*) *can be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

1939

" Methods of, and apparatus for, televising films." Ges. zur Forderung der Forschung auf dem Gebiete der Technischen Physik an der Eidgenossischen Technischen Hochschule. September 16th, 1938. (547285.)

1940

2229. " Electric motors." Allspeed Electric Motors, Ltd. May 24th, 1939. (Cognate application, 2230/40.) (547245.)

11773. " Sound recording systems." Radio Corporation of America. August 5th, 1939. (547215.)

13858. " Mechanical relay movements, particularly applicable to type-printing telegraph apparatus." Creed & Co., Ltd., and R. G. Griffith. September 4th, 1940. (547247.)

16435. " Telephone and like systems." Telephone Manufacturing Co., Ltd., L. H. Paddle and B. Drake. November 13th, 1940. (547218.)

17730. " Thermostatic valve mechanism." British Thermostat Co., Ltd., and J. E. Sherlock. December 16th, 1940. (547220.)

17889. " Thermal electric switches, cut-outs and the like." G. F. Burgoyne and W. J. Warren. December 19th, 1940. (547291.)

1941

368. " Commutators for dynamo-electric machines." Hoover, Ltd., and C. B. Wilson. January 10th, 1941. (547248.)

572. " Mercury or like electric switches." A. Cianchi. January 15th, 1941. (547327.)

626. " Electric ignition systems and apparatus." J. Lucas, Ltd., and J. A. Laird. January 16th, 1941. (Cognate application, 4532/41.) (547221.)

737. " Production of synthetic resins." British Thomson-Houston Co., Ltd. January 20th, 1940. (547328.)

1778. " Manufacture of magnetic materials." Johnson Laboratories, Inc. February 9th, 1940. (547187.)

2056. " Apparatus for depositing reflecting metallic coatings on base members or bodies." British Thomson-Houston Co., Ltd. February 14th, 1940. (547249.)

2063. " Valves." English Electric Co., Ltd., and P. W. Seewer. February 15th, 1941. (547191.)

2135. " Electron discharge devices and circuits therefor." Electrical Research Products, Inc. March 2nd, 1940. (547193.)

2212. " Apparatus for handling frequency or phase modulated electrical oscillations." A. C. Cossor, Ltd., and D. A. Bell. February 18th, 1941. (547231.)

2274. " Domestic washing machines." British Thomson-Houston Co., Ltd. February 21st, 1940. (547194.)

2291. " Electric contactors." R. Clarke and G. J. Scott. February 19th, 1941. (547362.)

2340. " Electric measuring instruments." Sangamo Weston, Ltd., and G. F. Tagg. February 20th, 1941. (547296.)

2600. " Domestic washing machines." British Thomson-Houston Co., Ltd. February 29th, 1940. (547197.)

2628. " Electrical busbars or the like." Foster Instrument Co., Ltd., and C. E. Foster. February 26th, 1941. (547198.)

2843. " Electrical conductors." W. W. Triggs (Carnegie-Illinois Steel Corporation). March 3rd, 1941. (547235.)

3232. " Image dissector tube." Farnsworth Television & Radio Corporation. March 11th, 1940. (547259.)

3855. " Busbar protective systems." British Thomson-Houston Co., Ltd. March 22nd, 1940. (547260.)

4076. " Magneto-electric machines." British Thomson-Houston Co., Ltd., and G. A. Freeman. March 26th, 1941. (547341.)

4113. " Electric systems for the control of the temperature of a space." British Thomson-Houston Co., Ltd. March 30th, 1940. (547241)

4431. " Couplings for electric cables." W. T. Henley's Telegraph Works Co., Ltd., and H. C. Hoban. April 2nd, 1941. (547262.)

4575. " Lights for guiding aircraft." Chance Bros. & Co., Ltd., and J. G. Holmes. April 5th, 1941. (547345.)

4767, 4768 and 4771. " Gas turbines." British Thomson-Houston Co., Ltd. (General Electric Co.). April 10th, 1941. (547202, 547203 and 547205.)

4770. " Cooling arrangements for gas turbines." British Thomson-Houston Co., Ltd. (General Electric Co.). April 10th, 1941. (547204.)

5894. " Vacuum-tight seals between electric current leads and containers of quartz or like vitreous material." Crompton Parkinson, Ltd., and P. Freedman. May 6th, 1941. (547300.)

6024. " Electrically controlled visual indicators." Standard Telephones & Cables, Ltd. May 15th, 1940. (547268.)

6025. " Transmission systems for electrical communication." Standard Telephones & Cables, Ltd. May 11th, 1940. (547269.)

6821. " Thermionic amplifiers." British Thomson-Houston Co., Ltd. May 29th, 1940. (547276.)

6944. " Electrical switching devices with interruption of power and subsequent voltage disconnection for the protection of polyphase systems." Akt.-Ges. Brown, Boveri & Cie. May 6th, 1940. (547277.)

7388. " Switching means for interconnecting co-axial conductors." Standard Telephones & Cables, Ltd., W. Kram and F. L. J. Jarvis. June 11th, 1941. (Addition to 513287.) (547280.)

7498. " Ultra-high-frequency harmonic generating systems." Standard Telephones & Cables, Ltd. June 18th, 1940. (547281.)

7508. " Wire coating devices." British

Thomson-Houston Co., Ltd. June 15th, 1940. (547311.)

8251. "Soldering irons." Standard Telephones & Cables, Ltd. (Western Electric Co., Inc.). July 1st, 1941. (547303.)

8457. "Electric circuit control." Standard Telephones & Cables, Ltd. July 11th, 1940. (547304.)

9037. "Control of electro-magnetically vibrated apparatus such as conveyors." I. Vlasto and J. D. Forster. July 17th, 1941. (Cognate application, 14648/41.) (547352.)

9751. "Commutators for dynamo-electric machines." C. A. V., Ltd., and S. F. H. Parsons. July 31st, 1941. (547353.)

10079. "Emergency power supply circuit employing electrical discharge tube convertors." Standard Telephones & Cables, Ltd. August 14th, 1940. (547315.)

10729. "Electrical voltage regulators." Standard Telephones & Cables, Ltd. August 31st, 1940. (547313.)

10844. "Apparatus for laying flexible elements, for example, electric cables." A. J. Shrosbery, A. V. Flutter, F. H. S. Smith and T. Clarke & Co., Ltd. August 25th, 1941. (Cognate application, 13576/41.) (547318.)

11314. "Locking devices for electric incandescent lamps." J. A. Brook. September 4th, 1941. (547355.)

11369. "Wave filter." Standard Telephones & Cables, Ltd. September 14th, 1940. (547357)

12350. "Refrigerator cabinets." British Thomson-Houston Co., Ltd. September 27th, 1940. (547360.)

12456. "Gas-blast electric circuit-breakers." British Thomson-Houston Co., Ltd. September 28th, 1940. (547361.)

Amended Specification.

538969. "Regulating arrangements for the regulation of interior temperature of buildings." Landis & Gyr Soc. Anon.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Orders Placed

London.—WESTMINSTER.—Works Committee. Recommended. Eleven electric vehicle traction batteries (£2,503).—Young Accumulator Co.

METROPOLITAN WATER BOARD.—Accepted. Cable for primary filters (£620).—Aberdare Cables. Two electrically driven booster pumps (£598).—Harland Engineering Co.

Swansea.—ELECTRICITY COMMITTEE. Accepted. Motor-driven "Megger" testing set (£84).—Woodhall & Partners.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ancoats.—Additions to works; N. Bennett, architect, Dales Brow House, Swinton, Manchester.

Blackley.—Office and research block; Fram Reinforced Concrete Co., Ltd., 165, Plymouth Grove, Longsight, Manchester, 13.

Cheetham.—Additions to factory; Drury & Gomersall, architects, 11, Imperial Buildings, Oxford Road, Manchester, 1.

Cleckheaton.—Canteen and cloakrooms, Gladstone Street; J. Roberts & Co., engineers.

Mechanics' shop; British Belting & Asbestos, Ltd., Scandinavia Mills.

Durham.—Wartime nursery at Wheatley Hill; G. B. Clayton, Shire Hall, Durham City.

Edgeley.—Works extension, Avondale Road; Fugistall, Ltd., chocolate manufacturers, 29, Smedley Lane, Collyhurst.

Gorton.—Additions to works; Cruickshank & Seward, architects, 16 Princess Street, Manchester, 1.

Halifax.—Erection and equipment of two huts at day nurseries, Ling Bob and Siddal; D. T. Lloyd Jones, borough engineer, Crossley Street.

King's Langley.—Alterations; King's Langley Engineering Co., Station Road.

Lichfield.—Wartime day nurseries and hostel for R.D.C.; T. Moseley, clerk, Rural Council House.

Linthwaite.—Headquarters at Grove House for West Riding Service of Youth Committee; Alderman W. M. Hyman, chairman, County Hall, Wakefield.

Manchester.—Factory extensions, Wythenshawe Eastern Industrial Area (£3,000); G. N. Hill, city architect.

Erection of day nursery at Northenden; city architect.

Marshland.—Adaptations at Institution for R.D.C.; surveyor, Council Offices, Alexandra Road, Wisbech.

Morpeth.—Farm buildings, at Hebron; R. Carse & Sons, Oldgate, Morpeth.

Moss Side.—Alterations and additions to Bakery for W. J. Brookes & Sons, Ltd.; Denham Mackeith & Partners, architects, Church Street, Blackley, Manchester.

Newcastle-on-Tyne.—Further school sheeltrs. Contractors: Hutchinson & Co.; Elliott Bros.; I. Berriman; and Sowerbys (Contractors), Ltd.

Canteen for Michell Bearings, Ltd.; J. C. Clarkson, 28, Benwell Grange Avenue, Newcastle.

Substation, Walker, for City Council; E. Thompson, builder, 12, Grey Street.

Offerton.—Additions to Waterside Mills, Marple Road; National Colours, Ltd.

Openshaw.—Additions to works for Hugon & Co., Ltd., suet refiners; W. Chappell & Sons, Ltd., builders, Chappell Road, Droylsden, Manchester.

Peterborough.—Provision of three British Restaurants, Midland Road, Fletton, and New England area; borough engineer, Town Hall.

Reddish.—Pump house at confectionery works, Newark Road, South Reddish; Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester.

Staffordshire.—Erection of wartime day nursery at Leek; C. M. Coombs, county architect, County Buildings, Stafford.

Stockport.—Wartime nursery at Daw End; Henry Bardsley & Sons, Ltd., builders, Booth Street, Stockport.

Machinery and plant for laundry at P.A.C. Institution; W. F. Gardner, borough engineer, Town Hall, Stockport.

Works additions; Stockport Timber Co., India Mill Yard.

Offices, Railway Road, Wellington Road South; E. Shirley & Sons, Ltd., coal merchants.

Stretford.—Canteen, Trafford Park Road; J. Ashworth & Co., Ltd.

Gas cleansing station, Old Trafford, borough engineer.

Extensions to bakehouse; A. Whitehead, baker and confectioner, 1206, Chester Road, Stretford.

Tonbridge.—Addition to Hildenborough infant welfare centre; surveyor, Council Offices, 48, Pembury Road.

Wakefield.—Mortuaries at six sites in rural area for R.D.C.; W. E. Massie, engineer, R.D.C. Offices, 18, St. John's North, Wakefield.

Watford.—Offices and workshop, Tolpits Lane; Scammell Lorries, Ltd.

Wath-on-Dearne.—British Restaurant at West Melton; W. E. Haigh, surveyor, Town Hall, Wath-on-Dearne, near Rotherham.

Switchboard Fire Hazards

New Zealand Royal Commission's Comments

CLOSER supervision of the location of electrical equipment and its installation is called for in the report of a New Zealand Royal Commission which has inquired into the causes of a disastrous fire at Auckland last year which destroyed a large block of buildings occupied by John Burns & Co., Ltd. The company subsequently issued a writ against the Auckland Electric Power Board claiming £225,188 damages (*Electrical Review*, May 22nd, p. 664).

In its report, details of which are published in the *New Zealand Electrical Journal*, the Commission drew attention to the fact that in the year ended September 31st, 1941, there had been 100 fires of electrical origin in New Zealand. A number of switchboard fires occurred annually and the switchboard must be regarded as a potential fire hazard. The regulations required the Power Board to inspect installations at intervals of not more than five years whereas that at the premises of John Burns had not been inspected since its erection in 1934. An inspection, if properly made, must have disclosed the defects—bad location, defective fuses and absence of cover. This failure to make the inspection required by law was a grave dereliction of duty by the Power Board. The omission was the more inexcusable because the Chief Electrical Engineer wrote to the Board in 1939 pointing out that in four cases of fires caused by electricity inspections within the five-year period had not been made. The evidence also showed that the Power Board had failed to obey the regulation requiring inspection to be made while electrical work was in progress.

In 1940 the sub-contractor for electrical work at the premises of John Burns obtained a permit to make alterations which remained in force for three months. No inspection was ever made during the work, which was still in progress at the time of the fire. The adoption of some more or less standard routine of inspection appeared desirable if defects such as those existing in the case of John Burns were to be corrected.

The inquiry revealed that the fire was caused by a remarkable concatenation of circumstances. An office boy, while drawing a trolley laden with books, accidentally knocked off the plug of an electrical circuit supplying an adding machine. An unregistered wireman, instead of drawing the fuse of that circuit to render it safe as he should have done, proceeded to unscrew the part of the socket remaining on the post in order, he said, to shake out the plug. He could not shake it out, and tried to push it out from behind with a screwdriver, which caused a "short." Had the switchboard been in order nothing further would have happened other than a blown fuse, but the Commission found that the switchboard was not in proper order.

Speed-reducing Gearing

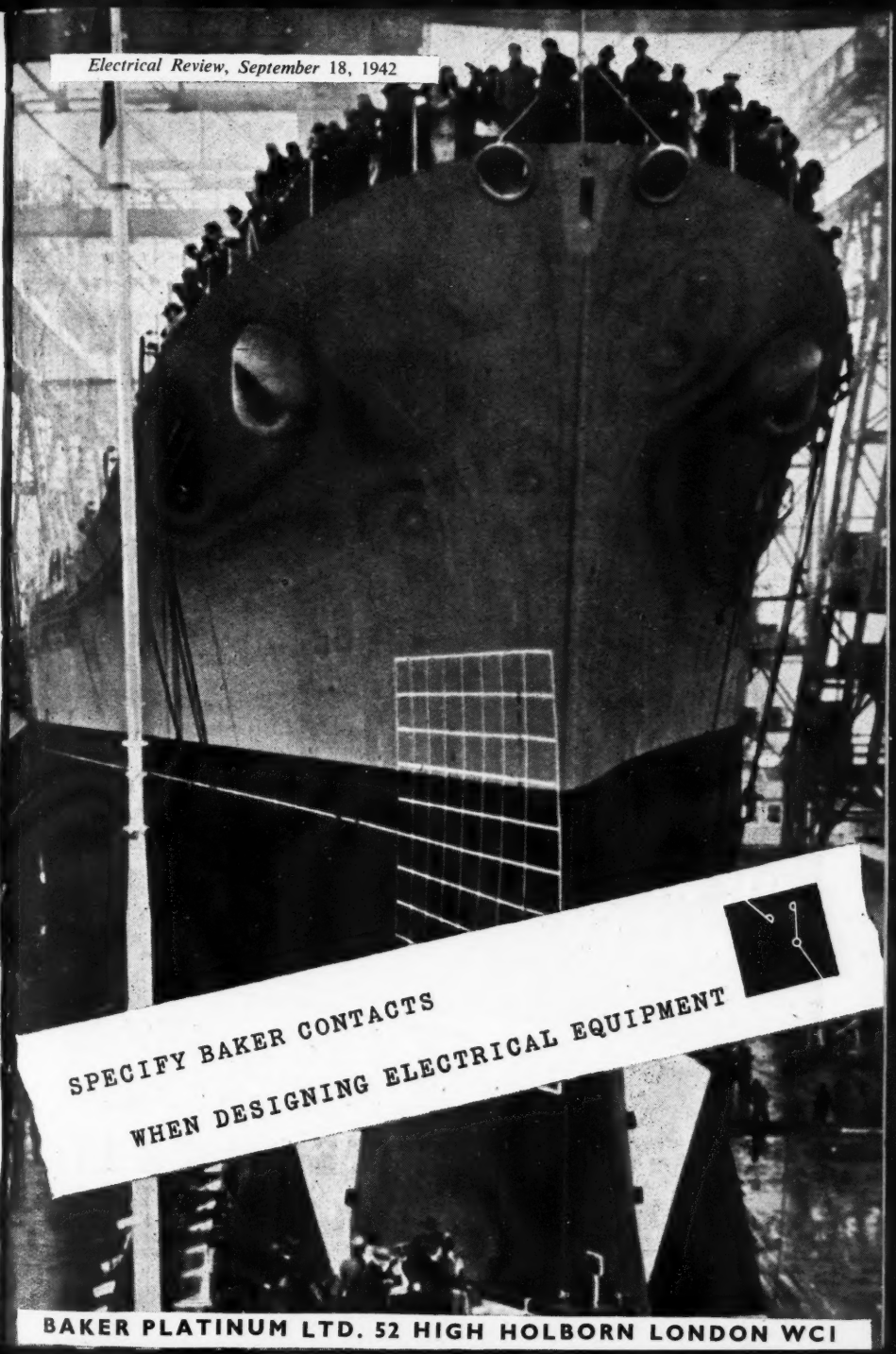
Parsons Memorial Lecture

THE pioneer work of the late Sir Charles Parsons in developing mechanical speed-reducing gearing for propelling ships by steam turbines, more particularly naval vessels, was the subject of this year's memorial lecture by Dr. S. F. Dorey (Lloyd's Register of Shipping) delivered in London on September 16th.

The introduction of double-reduction gears to the mercantile marine was mentioned, and there were references to the materials employed for the construction of gear wheels and pinions. A section on the periodic errors of "solid table" gear-cutting machines showed how, with the aid of a microphone and oscillograph, Parsons proved that noise frequency corresponded to the number of teeth in the worm wheel of the gear-cutting machine multiplied by the revolutions of the wheel. Parsons' introduction in 1913 of his ingenious "creeping" table machine, together with the advantages accruing from the longitudinal freedom afforded by flexible coupling had made the best contribution towards the reduction of gear noise.

Undulations introduced by periodic errors o gear-cutting machines could now be accurately measured with an instrument designed by Dr. G. A. Tomlinson, Metrology Department, National Physical Laboratory.

Lubrication in relation to gear loads was mentioned, and the final summing up of achievements indicated how comparison of the original "Vespasian" (1910) with the "Queen Mary" showed that power transmitted through a single gear had increased from 1,100 to about 40,000 SHP.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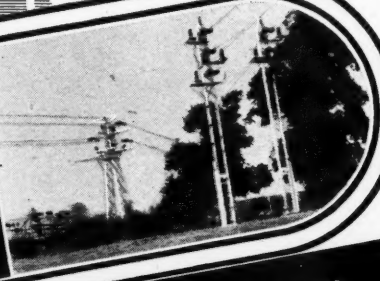

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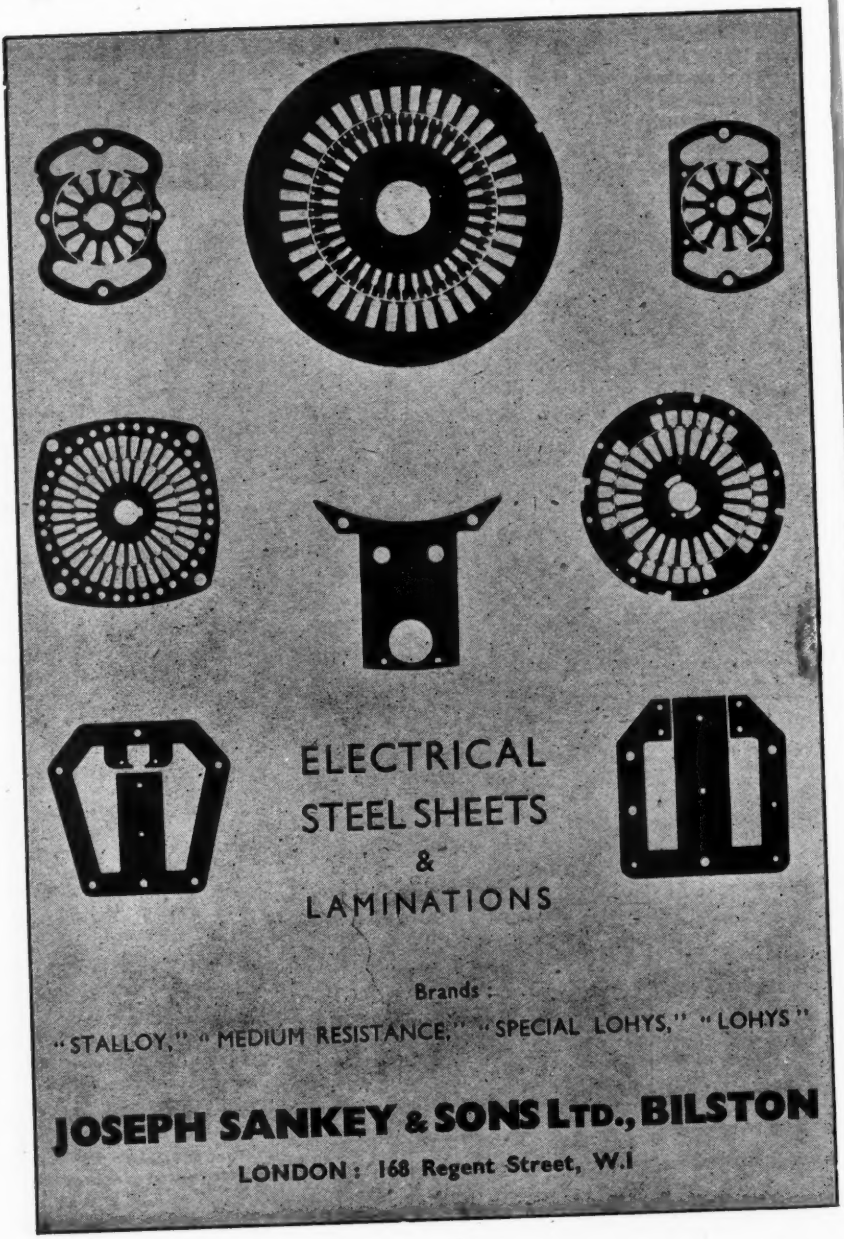
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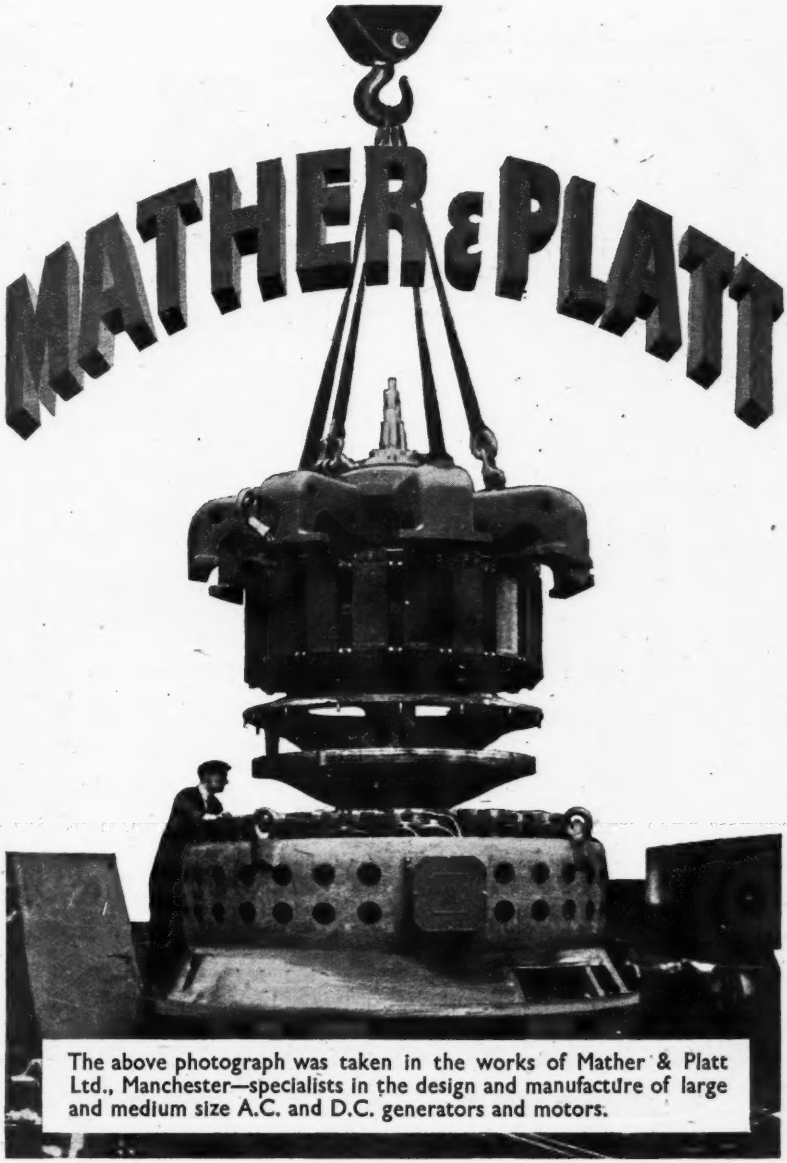

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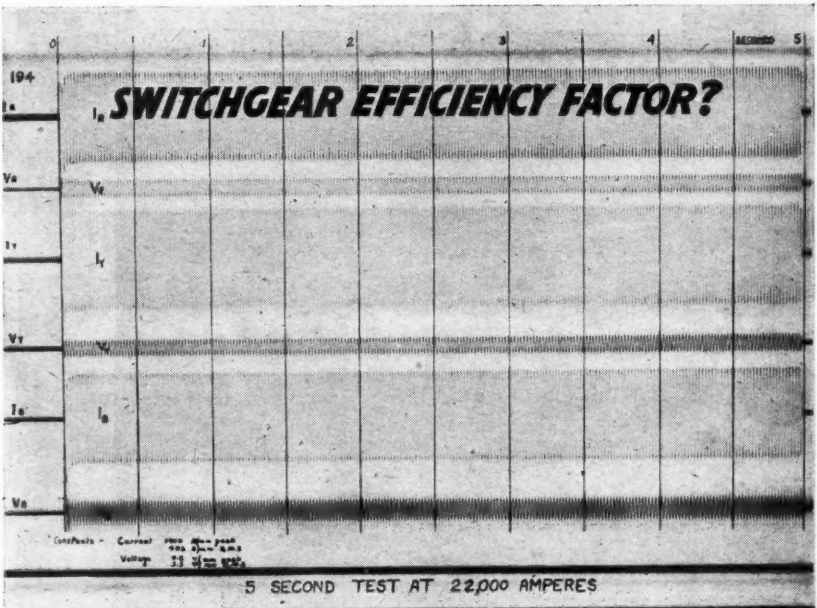

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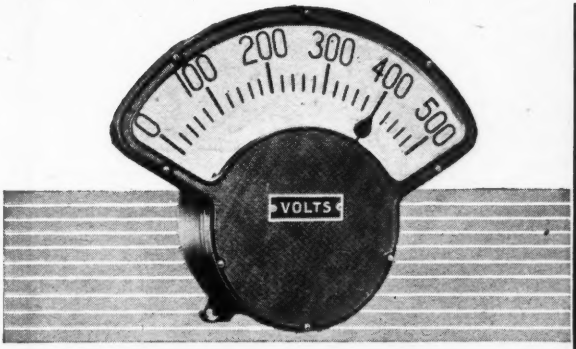

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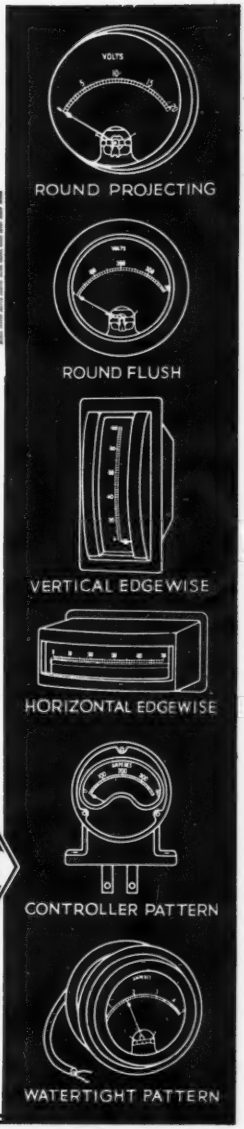

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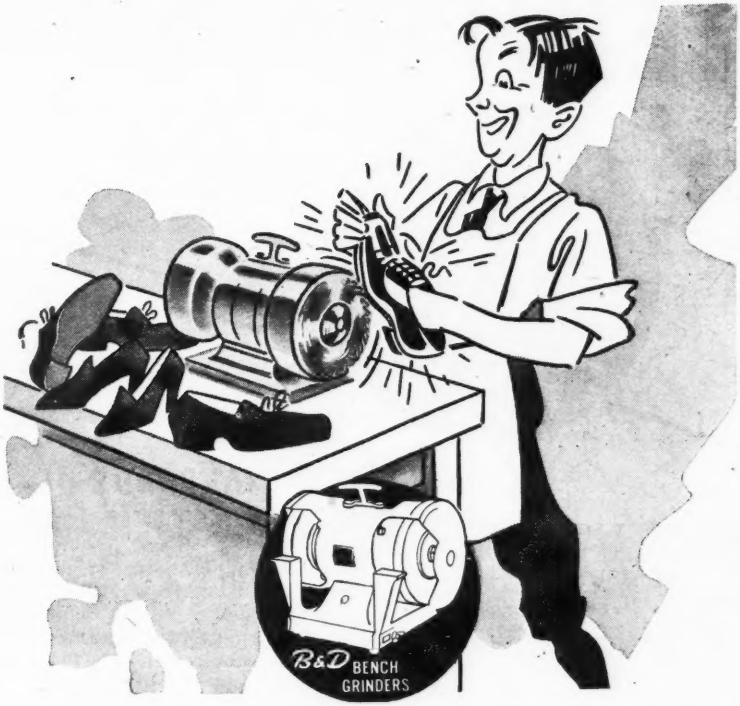

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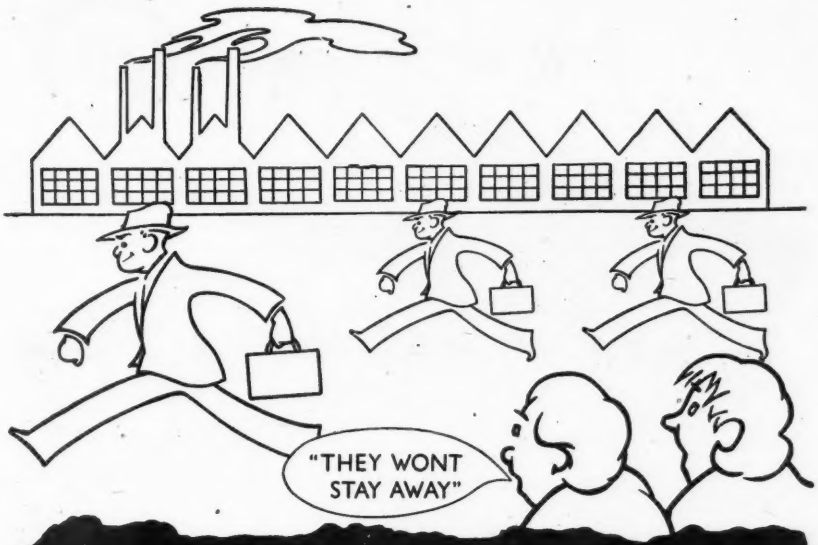

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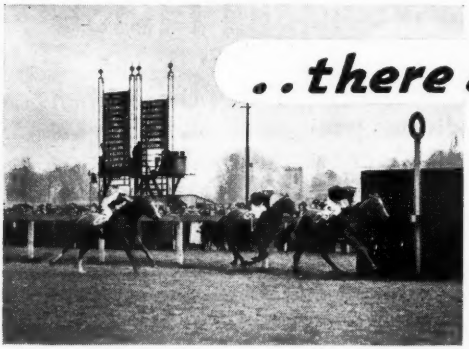

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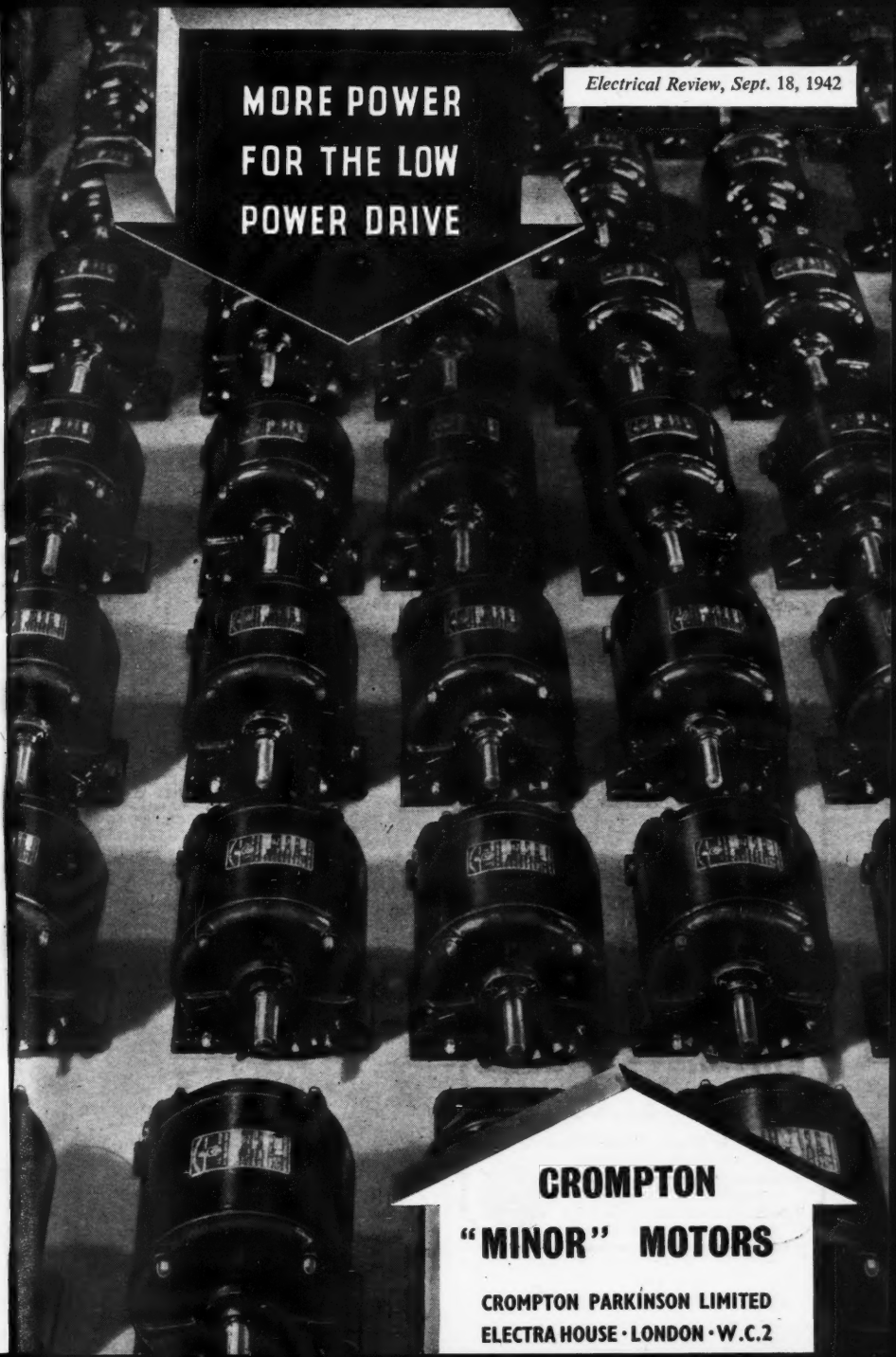
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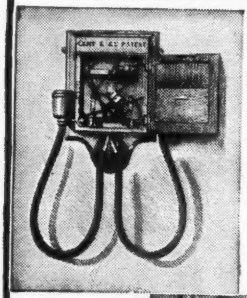

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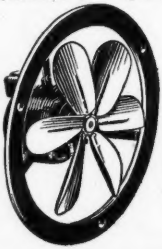

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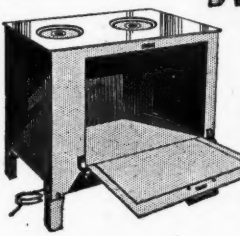
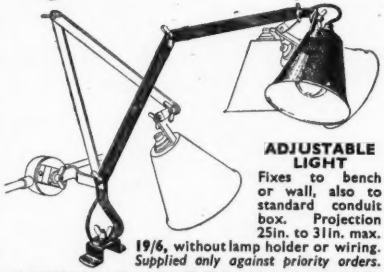
750 watts. Guaranteed to withstand any degree of heat developed in use. Spiral resistance made from finest nickel-chrome. Price **13/6,** plus 20%, without flex, plus P.T.

Note Patented "Split" which prevents cracking



ELECTRIC PLATE WARMER AND HOT CUPBOARD

Holds thirty ten-inch dinner plates—in addition a warming surface 18in. by 13in. Price **£5/12/6,** without purchase tax.
Supplied only against priority orders



ADJUSTABLE LIGHT

Fixes to bench or wall, also to standard conduit box. Projection 25in. to 31in. max.
19/6, without lamp holder or wiring.
Supplied only against priority orders.

L. G. HAWKINS & CO. LTD., 30/35 Drury Lane, London, W.C.2

AGRO BAKELITE BLOCKS

THE ALTERNATIVE TO WOOD BLOCKS

AS SUPPLIED TO THE
AIR MINISTRY
PROMPT DELIVERY

No. 5050 Round type for one 2" or 2¼" 5-ampere switch.
No. 7070 Round type for one 2" centre Ceiling Rose.
No. 8080 Oblong type for two 2" or 2¼" 5-ampere switches.
BROWN BAKELITE

Marketed by **T.M.C.-HARWELL (SALES) LTD.**
BRITANNIA HOUSE, 233 SHAFTESBURY AVENUE, LONDON, W.C.2
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TRANSLUCENT WHITE OPAL
MOULDED SHADES

Supplied in White Opal, Green and Opal and other attractive colours, also in black for A.R.P. use. A feature of "Goltone" Moulded Plastic Shades is their resistance to blast and concussion.

Extract from War Emergency Code BS.1062, 1942:
"Shades should preferably be made of Plastic material."

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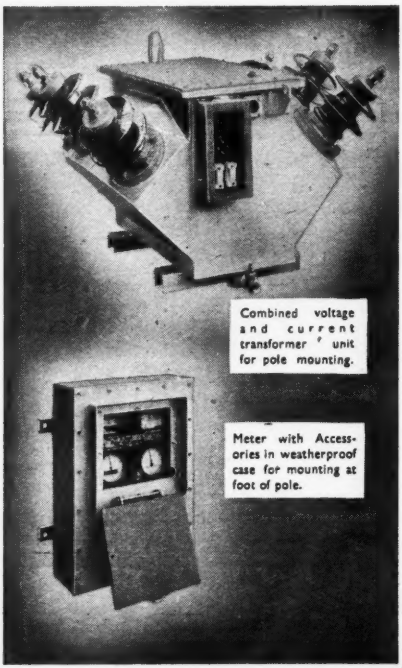
ELECTRICAL ACCESSORIES

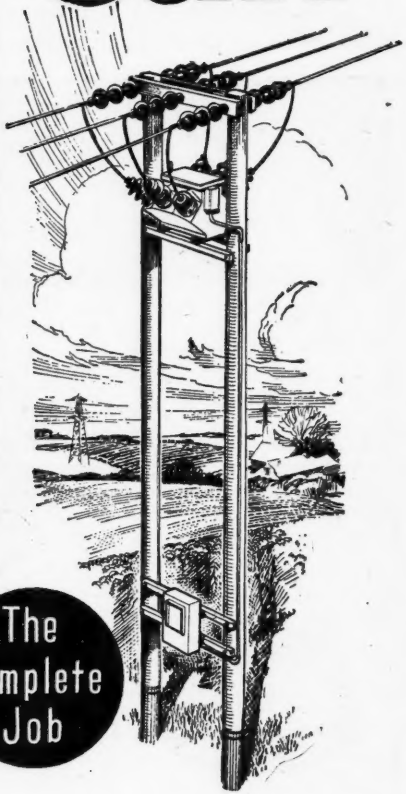
We apologise for not giving perfect service now, but hope to after we have won the war.

SPERRYN & CO. MOORSOM ST. WORKS BIRMINGHAM

Outdoor Metering Equipment

specially designed & developed by **C&H**


Combined voltage and current transformer unit for pole mounting.
Meter with Accessories in weatherproof case for mounting at foot of pole.



The Complete Job

These are views of a typical 11 kV equipment.

It is also available for 3.3 kV, 6.6 kV, 22 kV, and 33 kV systems.

Manufacturers—

CHAMBERLAIN & HOOKHAM LTD., BIRMINGHAM